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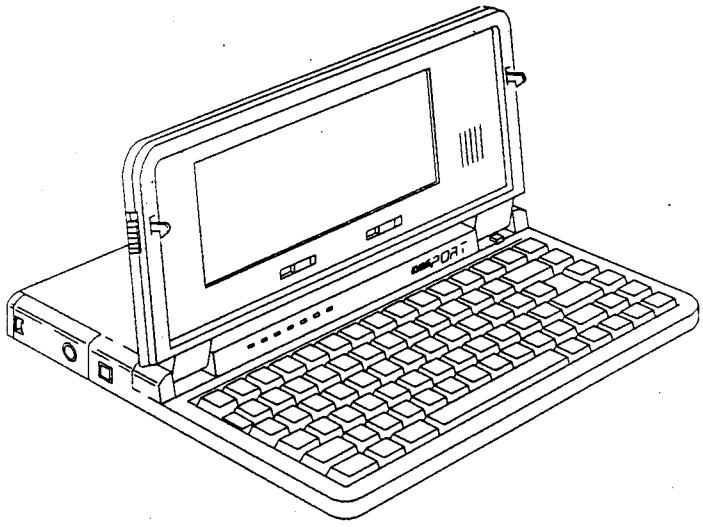

MinisPort ZL-1 Series Computers Service Manual

585-303 860-212

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St. Joseph, Michigan 49085

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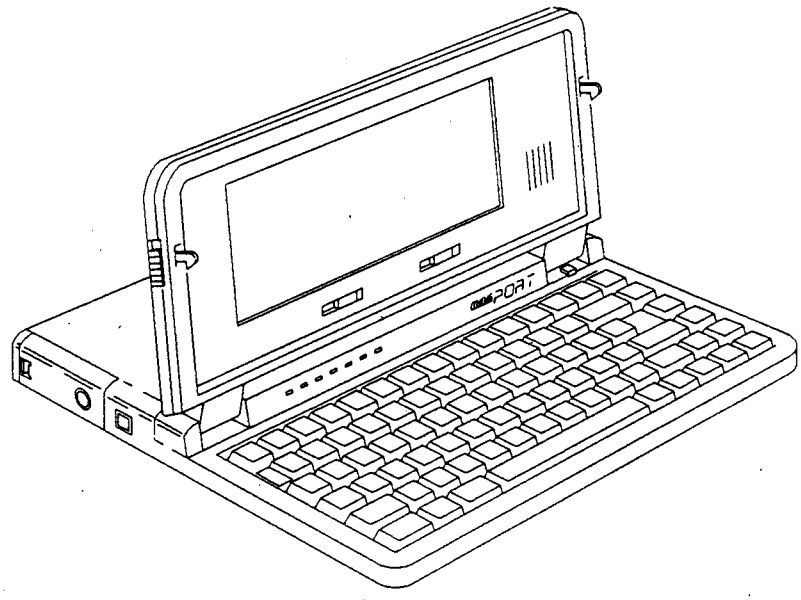
Chapter 1
Introduction

This service manual provides information to service the MinisPort Portable Computer to the circuit board or subassembly level only. This manual also includes basic operating instructions and an abbreviated installation procedure for this computer.

Figure 1-1. MinisPort Portable Computer



Related Publications

MinisPort Portable Computer Owner's Manual (595-4214)

MinisPort Portable Computer Technical Reference Manual (595-4354)

Options and peripheral equipment for this computer have separate manuals which are not listed here.

Tools and Equipment

The tools and equipment required to service the computer with this service manual include:

- A small flat-blade screwdriver
- A #2 phillips screwdriver
- A small phillips screwdriver
- A set of nutdrivers
- *Disk-Based Diagnostics* (CB-31-06)

Specifications

The following specifications apply to the MinisPort Portable Computer. Optional features that may be present on some models are indicated.

Processor: 80C88 CMOS 16-bit processor.

Clock speed: Software selectable; 8 MHz or 4.77 MHz.

Memory: 1M base memory, expandable to 2M.

Display: 640 x 200 pixel flat-panel liquid crystal.

Sound: Miniature transducer.

Input/output

Serial port:	Asynchronous serial RS-232C port (DB-9 connector).
Parallel port:	Centronics-type parallel output port (DB-25 connector).
Video:	Composite (monochrome) video and RGB (color) video with intensity signals from a single 9-pin connector.

Floppy disk: 2.0-inch double-sided, high density, 720K formatted capacity floppy disk drive.

Power requirements

AC power:	115V adapter/charger included.
Battery power:	12V (4.0 AHr) removable battery pack with overcharge and short circuit protection. Battery life is 1000 charge/discharge cycles.

Keyboard: 80 keys; full 84-key keyboard and 101-key keyboard compatibility maintained by using mode switching and multiple keys to duplicate keypad and special function key operation.

Chapter 2
Installation

This chapter describes unpacking, setting up, and starting up the computer.

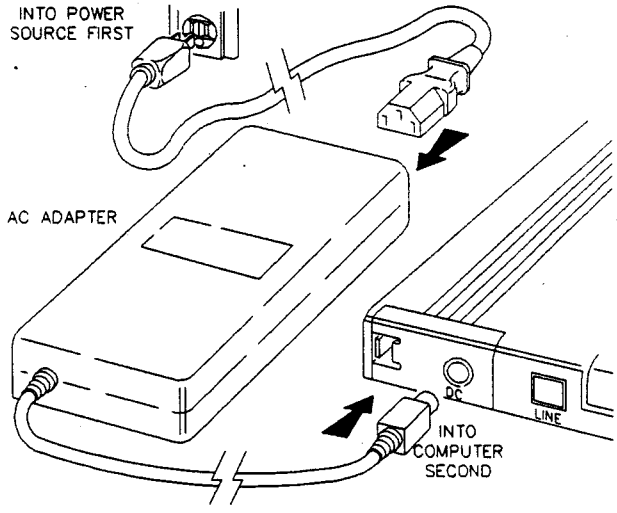
NOTICE As with all electrical devices, this computer is sensitive to temperature extremes. Extreme cold or heat can seriously damage the LCD display and disk drives. After storage at low temperatures, allow ample time for the computer to warm to room temperature before operating. Do not turn on the computer if there is water condensation on it (there will also be water condensed inside the computer, which can damage the electronics).

Unpacking and Setting Up

1. Carefully unpack the computer.

2. Locate the computer power cord and AC adapter. Plug the appropriate end of the cord into the connector on the AC adapter and then connect the adapter to the computer, as shown in Figure 2-1.

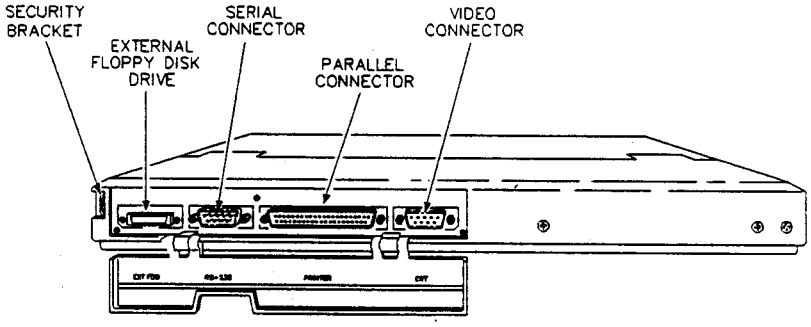
Figure 2-1. AC Adapter Connection



3. The external connectors on the back of the computer are shown in Figure 2-2. They are:

   - The video connector (CRT)
   - The parallel connector (PRINTER)
   - The serial connector (RS-232)
   - The external disk drive connector (EXT. FDD)

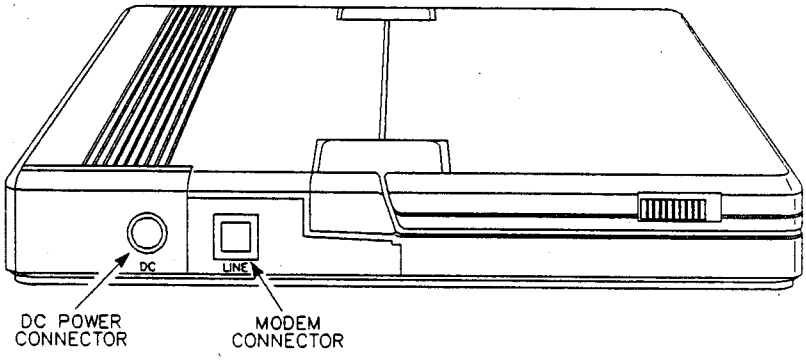
Figure 2-2. Back View



Two other external connectors located on the left side of the computer are shown in Figure 2-3. They are:

- The DC power connector (DC)
- The modem connector (LINE)

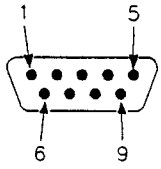
Figure 2-3. Left Side View



4. If you are installing any optional hardware, proceed to the "Installation of Options" section at the end of this chapter.

Video Connector — This connector supplies RGB video output for an external color video monitor, and a composite monochrome signal for an external monochrome video monitor. The video connector pinout is shown in Table 2-1.

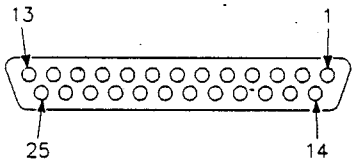
Table 2-1. Video Connector Pinout



PIN	SIGNAL
1	Ground
2	Ground
3	Red
4	Green
5	Blue
6	Intensity
7	Composite
8	Horizontal sync
9	Vertical sync

Parallel Port — This connector provides Centronics-type output signals for a parallel printer or peripheral. The operating system contains the necessary software to configure this connector for use with most parallel devices. The parallel port connector pinout is shown in Table 2-2.

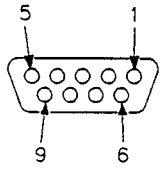
Table 2-2. Parallel Port Connector Pinout



PIN	SIGNAL
1	Strobe
2	Data bit 0
3	Data bit 1
4	Data bit 2
5	Data bit 3
6	Data bit 4
7	Data bit 5
8	Data bit 6
9	Data bit 7
10	Acknowledge
11	Busy
12	Paper end
13	Select
14	Automatic feed
15	Error
16	Initialize
17	Select in
18 – 25	Ground

Serial Port — This connector is an RS-232C DTE input/output port for use with a serial printer or peripheral. The operating system contains the necessary software to configure the connector for use with most serial devices. The serial port connector pinout is shown in Table 2-3.

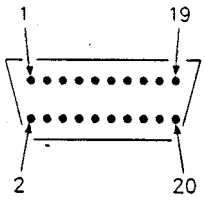
Table 2-3. Serial Port Connector Pinout



PIN	SIGNAL
1	Carrier detect (CD)
2	Receive data (RD)
3	Transmit data (TD)
4	Data terminal ready (DTR)
5	Signal ground
6	Data set ready (DSR)
7	Request to send (RTS)
8	Clear to send (CTS)
9	Ring indicator (RI)

External Disk Drive Connector — This connector provides the signals necessary to connect an external disk drive to the computer. The external disk drive connector pinout is shown is Table 2-4.

Table 2-4. External Disk Drive Connector Pinout

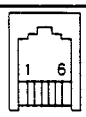


PIN	SIGNAL
1	No connection
2	Side select
3	Read data
4	Ground
5	Write protect
6	Track 0
7	Index
8	Write enable
9	Write data
10, 12	Ground
11	Step
13	Direction select
14	Drive select 2
15	No connection
16	Motor on
17	VCC
18	VCC
19, 20	Ground

DC Power Connector — This connector provides the voltages used by the various circuits in the computer. Power for the computer comes from an external adapter (120-volt AC line, or 12-volt DC cigarette lighter) or an external battery pack.

Modem Connector — On computers equipped with an internal modem, a connector is present on the left side of the computer. This LINE connector supplies the necessary signals for modem-to-modem communication; it connects the internal modem to the telephone company line. Table 2-5 shows the line connector pinout.

Table 2-5. Line Connector Pinout

	PIN	SIGNAL
	1 – 2	Not connected
	3	Ring
	4	Tip
	5 – 6	Not connected

Installation of Options

Static Precautions

This section provides installation instructions for optional computer hardware. Refer to Chapter 5 for disassembly procedures.

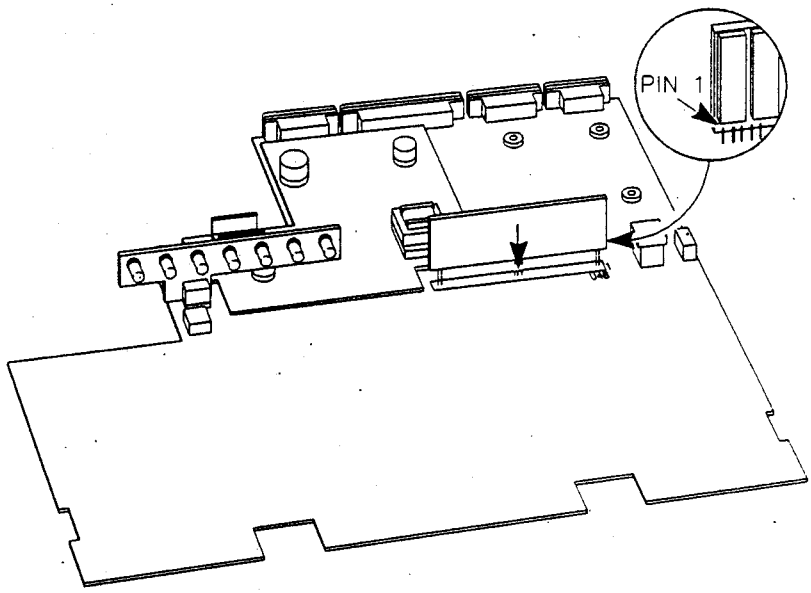
Use the following procedures when handling circuit boards or integrated circuits (ICs):

- Do not remove any static-sensitive device from its protective packaging until you are ready to install it.
- Equalize the static electricity between the work surface, the device, and you, by touching the work surface with one hand and then picking up the device with the other hand.
- Once you have removed the device from its protective packaging, do not set it down until it is installed in the computer or returned to its protective packaging.

One-Megabyte Memory Option

1. Remove the main board as described in Chapter 5.
2. Install the one-megabyte memory module in the main board as shown in Figure 2-4. Be sure pin 1 on the memory module correctly seats in the main board.
3. Solder the leads of the memory module on the component side of the main board.
4. Replace the main board and reassemble the computer.
5. Update the memory size in the Setup/Configuration program, as described in Chapter 4.

Figure 2-4. Memory Option Installation.



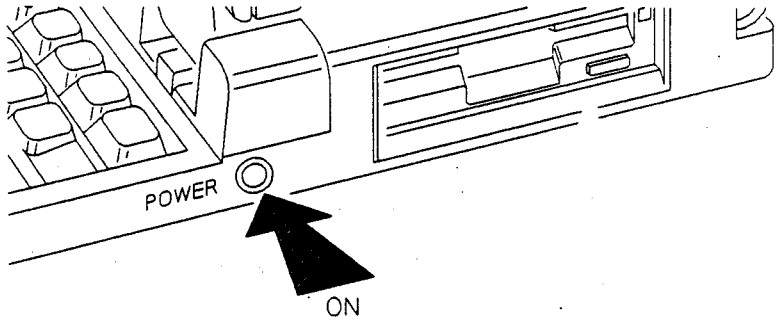
Chapter 3
Operation

Use this chapter as a reference guide for operating the computer. Refer to the ***Owner's Manual*** for complete operating instructions.

Power-Up Procedure

To power up the computer, press the button on the right side of the computer, as shown in Figure 3-1. This button operates a momentary contact switch, so be sure to press the button in for at least one second.

Figure 3-1. Turning On the Power



Each time the computer is turned on, it automatically performs a series of internal self-tests that check the major circuits and verify that various functions operate properly. If some part of the computer fails to operate correctly, the computer attempts to display an error message on the LCD screen.

In addition to the self-tests, the following events occur when power is turned on:

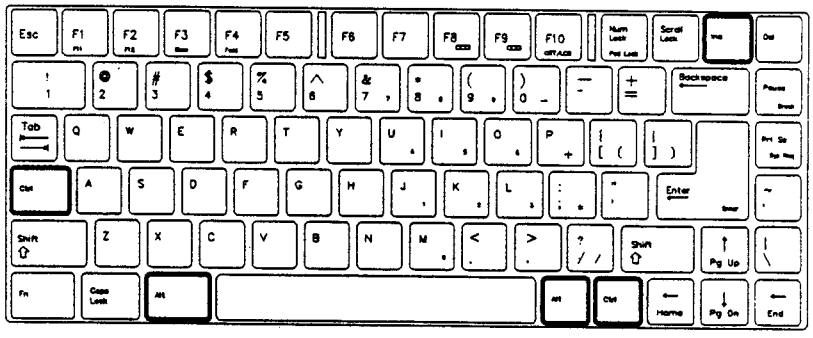
- The LEDs labeled POWER and NUM LOCK on the keyboard glow.
- The LED for the floppy disk drive lights.
- The drive makes some sounds as its' read/write heads move back and forth.
- A blinking cursor appears on the LCD screen.
- After a short time, the computer starts the "autoboot" procedure. Autoboot is the automatic loading (transferring) of an operating system from the floppy disk or ROM (Read-Only Memory) into the computer's memory. The end of this chapter includes more details about autoboot.

The floppy drive LED will remain lit for a few seconds. Since there is no floppy disk in the drive, the operating system will load from the ROM.

Entering the Monitor Program

Enter the Monitor program by pressing the CTRL (control), ALT (alternate) and INS (insert) keys. Hold them down briefly and then release them. Figure 3-2 shows the location of the keys used to enter the Monitor program.

Figure 3-2. Entering the Monitor Program



The Monitor program is a special program permanently built into the computer. The Monitor program message is displayed on the LCD:

```
MFM-180 Monitor, Version x.xx
Memory Size: xxx
Enter "?" for help.
->_
```

The computer will display numbers in place of the x's shown.

Booting Manually and Autobooting

To disable the autoboot feature and boot a disk manually:

1. Enter the Monitor program directly by pressing the CTRL-ALT-INS key combination.

2. Change the boot drive information stored in the computer's memory by the Setup/Configuration program.

To enable the computer to autoboot:

1. Insert a bootable disk in the floppy disk drive within several seconds of turning on power to the computer. Remember that a bootable disk has the operating system on it.

2. With a bootable disk installed in the floppy disk drive, reset the computer using the CTRL-ALT-DEL key combination.

3. If necessary, change the boot drive information stored in the computer's memory by the Setup/Configuration program.

This computer is factory-set to autoboot from the floppy disk drive and, if no bootable disk is in the drive, to boot from the ROM.

Disk Drives

This computer contains a single 2-inch floppy disk drive. You may connect an external 2-, 3.5-, or 5.25-inch double-density floppy disk drive through a back panel connector. The computer also contains a unique feature called a silicon disk drive.

Disk drives are identified by MS-DOS with letters, starting with drive A. The following paragraphs identify each letter with the drive(s) and how they integrate into the system.

Drive A — This is the 2-inch floppy disk drive built into the right side of the computer. Each disk has a capacity of 720K. You can optionally use the Setup/Configuration program described in Chapter 4 to specify drive A as an external floppy disk drive. When drive A is specified as an external floppy disk drive, the built-in drive becomes drive B.

Drive B — This is the external floppy disk drive connected to the computer through the back panel connector EXT. FDD. If there is no drive, MS-DOS will substitute the built-in floppy disk drive and prompt you to exchange disks as needed.

Drive C — This is the read-only silicon disk drive. It contains MS-DOS and the FastLynx LX™ transfer program.

Drive D — This is the read/write part of the silicon disk drive. You must set aside memory in the Setup/Configuration program (described in Chapter 4) for this drive. You can specify a minimum 64K up to a maximum of 368K in 1-megabyte computers. If a 1-megabyte memory expansion module is added to your computer, you can specify up to 1,392K.

Figure 3-3 identifies the parts of the 2-inch disk drive and shows the correct orientation of the floppy disk. Slide the disk through the disk load slot (the disk slot door moves out of the way) until it clicks into place and the eject button pops out.

NOTICE Do not force any disk into a drive. If the disk does not slide smoothly and completely into place, make sure there is no disk already in the drive. Also make sure the disk being inserted is positioned properly with the label up and the notched corner to the left. If you force a disk into the drive, you can damage the disk and the drive.

To release the disk, wait until the disk access light is out, then press the eject button. The disk will pop partially out of the drive.

Figure 3-3. The 2-Inch Disk Drive

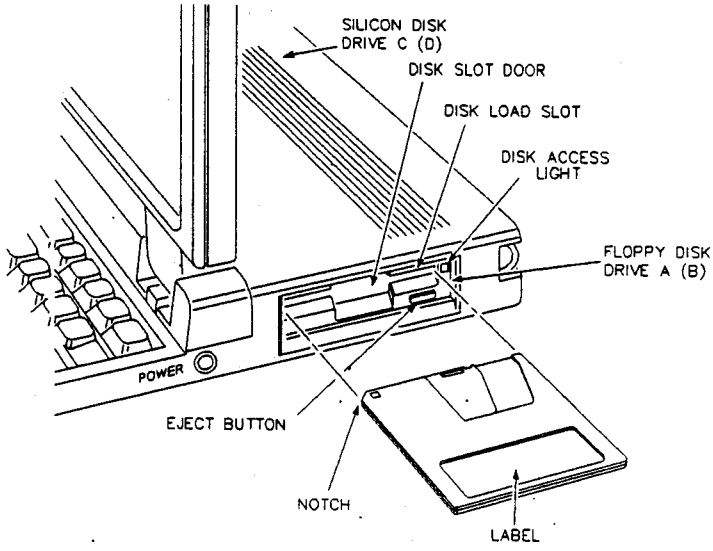
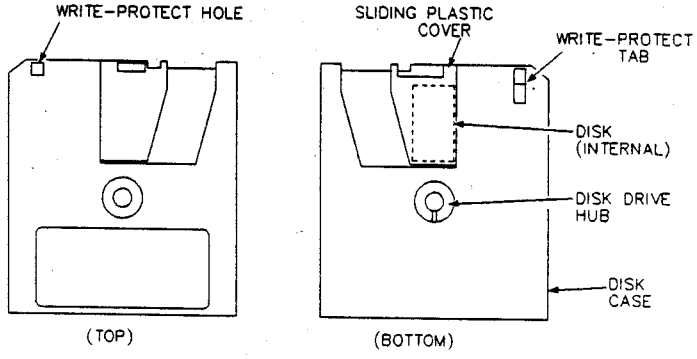


Figure 3-4 illustrates the parts of the floppy disk. The sliding cover protects the disk from dust and dirt.

The write-protect hole, when open, prevents writing to the disk. To write to a disk, slide the tab to cover the hole (writeable).

Figure 3-4. The 2-Inch Floppy Disk



Keyboard

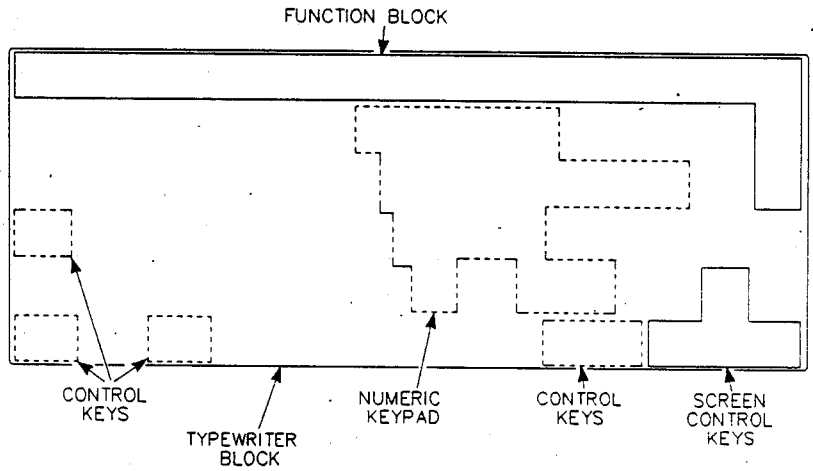
This section describes the keys used by the hardware and the Setup/Configuration program covered in Chapter 4. Since applications can use the keys differently, refer to the documentation that accompanies the software for specific information about the use of the keys.

The 80-key keyboard built into this computer emulates desktop PC- and AT-compatible keyboards, including 101-key keyboards. Features include auto-repeat, and audible feedback. Raised bumps identify the F and J keys, identifying them as "home keys" for touch operation.

Auto-repeat is active for most keys. When you press and hold a key, it starts repeating, slowly at first, then more quickly the longer you hold the key down. Keys that do not repeat are those that modify other keys or halt program operation: FN, SHIFT, ALT, CTRL, PAUSE/BREAK, CAPS LOCK, SCROLL LOCK, and NUM LOCK/PAD LOCK.

The keys are arranged in groups, as shown in Figure 3-5.

Figure 3-5. Key Groups on the Keyboard



Typewriter block — The typewriter block contains all the character keys, along with several control keys. It follows the same general layout as the typewriter block on desktop computer keyboards.

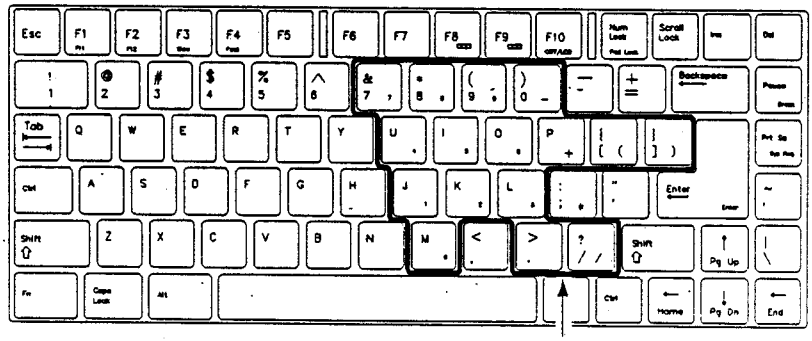
Numeric keypad — The typewriter block also contains the numeric keypad, which is illustrated in Figure 3-6. You activate or deactivate the keypad by pressing the FN-PAD LOCK key combination. The PAD LOCK indicator lights when the function is active.

The keypad supports the same features as the numeric keypad on desktop keyboards. In addition, the open and close parentheses keys support complex mathematical expressions.

The NUM LOCK key provides the same function as it does on desktop computer keyboards; it changes keypad operation from the screen (cursor) control mode to the numeric mode. The NUM LOCK indicator lights when the numeric mode is active.

The SHIFT key reverses the action of the NUM LOCK function. With the NUM LOCK function active (the indicator lit), pressing the SHIFT key with one of the numeric keys produces the screen control function. With the NUM LOCK function off, pressing the SHIFT key with one of the screen control keys produces the number.

Figure 3-6. The Numeric Keypad Keys



Function block — The remaining keys are the function block and include the escape key, ten function keys, and several special-purpose keys.

Keyboard Operation

Keyboard operation provides direction and control over the computer's functions. The following pages describe some features of the keyboard.

Keys that are not interchangeable — Two pairs of alphanumeric keys (four characters) — sometimes used interchangeably on typewriters — must be used correctly on the computer. These keys are the alpha lowercase L and numeric 1 keys and the alpha O and numeric 0 keys. Computers treat alpha and numeric characters differently. Therefore, using an alpha key for a numeric key can cause entry errors. Likewise, using numeric characters for alpha characters can result in incorrectly spelled words.

SHIFT and CAPS LOCK — The two SHIFT keys affect the letter and punctuation keys. Normally, when you press and hold a SHIFT key, the letter keys produce uppercase characters. But, if the CAPS LOCK function is active, the SHIFT keys produce lowercase characters. In the typewriter block you must use the SHIFT keys to produce the upper character on the punctuation and numeric keys, regardless of whether CAPS LOCK is active or not.

The action of the CAPS LOCK key is similar to the caps lock key on a typewriter, except that it affects only the letter keys. When CAPS LOCK is active (the CAPS LOCK indicator is lit), the letter keys produce uppercase characters. When inactive, the letter keys produce lowercase letters.

Unusual functions — Some programs, like the Setup/Configuration program described in Chapter 4, use the keyboard in special ways:

- TAB — Moves the cursor from field to field.
- Space bar — Moves forward through the selections within a field.
- BACKSPACE — Moves backward through the selections within a field.
- ESC — Signals the end of making changes.
- ENTER — Confirms the end of making the changes.

Modifier keys — Several keys modify the use of other keys. These include the ALT (alternate), CTRL (control), FN (function), and SHIFT keys.

Software companies generally use one of two methods to indicate key action for these keys in their documentation:

1. <key name> – <key>. This is the method used in this manual. CTRL-C indicates press and hold the CTRL key and then press the C key. ALT-~ indicates press and hold the ALT key and then press the tilde (~) key.

2. <caret><key>. This method is popular where the CTRL key is used widely by the application. ^C is the same as CTRL-C.

The CTRL and ALT keys modify the use of other keys. Sometimes both keys are used in conjunction with a third key. In this computer, the ALT key also generates the code for the green-labeled SYS REQ key.

Table 3-1 provides a list of common ALT and CTRL key combinations recognized by the computer in the Monitor program. The operating system and applications can override these combinations or modify them to produce different results.

Table 3-1. ALT and CTRL Key Combinations

COMBINATION	FUNCTION
CTRL-ALT-DEL	Resets the computer, initiates the power-up sequence, and starts autoboot (if enabled). Although this is sometimes called a "hard" reset, it will not always reset the computer to the power-on state.
CTRL-ALT-ENTER	Displays the contents of the CPU's registers and flags and returns control to the Multifunction Monitor. Do not use this combination to reach the Multifunction Monitor since the CPU's registers are not set to a known state.
CTRL-ALT-INS	Returns control to the Multifunction Monitor, and displays the Monitor version and memory size. This combination sometimes is called a "soft" reset since it sets the CPU registers to a known condition. It allows you to use the Multifunction Monitor commands, including the Setup/Configuration program, the test routines, and the boot command. This key combination overrides autoboot.
CTRL-P	Toggles printer echoing on and off. This function echoes the output to the computer screen and sends the same information to the printer.

Table 3-2 lists the functions performed by the FN (function), ALT, and SHIFT keys with the keyboard in various PAD LOCK and NUM LOCK modes.

Table 3-2. Key Function Matrix

DESIRED	NUM-LOCK / PAD-LOCK MODES			
CHARACTER	ON / OFF	OFF / OFF	ON / ON	OFF / ON
Lowercase letter or number printed in black	Keypad keys	Keypad keys	FN + keypad keys	FN + keypad keys
Uppercase letter or number printed in black	SHIFT + keypad keys	SHIFT + keypad keys	SHIFT + FN keypad keys	SHIFT + FN keypad keys
Number or symbol printed in light blue	FN + keypad keys	SHIFT + FN keypad keys	Keypad keys	SHIFT + keypad keys
Cursor, printed in light blue	SHIFT + FN keypad keys	FN + keypad keys	SHIFT + keypad keys	SHIFT + keypad keys
ASCII code	FN + ALT keypad keys	SHIFT + FN + ALT keypad keys	ALT keypad keys	ALT keypad keys

Table 3-3 lists actions performed when you press a key while holding down the FN (function) key.

Table 3-3. FN (Function) Key Action

FN-KEY COMBINATION[2]	RESULT[1]
FN-F1	F11
FN-F2	F12
FN-F3	Slow mode operation — 4.77 MHz CPU clock speed[3]
FN-F4	Fast mode operation — 8.00 MHz CPU clock speed[3]
FN-F8	Increments LCD palette setting[4]
FN-F9	Decrements LCD palette setting[4]
FN-F10	Toggles video output between LCD and CRT connector on back panel
FN-NUM LOCK	Toggles PAD LOCK on and off
FN-T	Toggles warning beep for lid and low battery
FN-↑	PgUp
FN-↓	PgDn
FN-←	Home
FN-→	End

Notes:

1. These keys will always respond in this manner, regardless of the settings of the CAPS LOCK, PAD LOCK, or NUM LOCK functions.
2. The keypad keys are dependent upon the settings of the CAPS LOCK, PAD LOCK, and NUM LOCK functions, along with the status of the ALT, CTRL, FN, and SHIFT keys.
3. You can use MS-DOS MACHINE SPEED commands in a batch file to duplicate these keys. Refer to MS-DOS for more information.
4. You can use MS-DOS MACHINE PALETTE commands in a batch file to duplicate these keys. Refer to MS-DOS for more information.

Table 3-4 provides a cross reference for keys on desktop computer keyboards with the key combinations required to produce them on this computer.

Table 3-4. Key Cross Reference

DESKTOP COMPUTER KEY	PORTABLE COMPUTER KEY COMBINATION
* (keypad)	* (keypad)[2]
+ (keypad)	+ (keypad)[2]
- (keypad)	- (keypad)[2]
/ (keypad)	/ (keypad)[2]
Alt-SysRq	ALT-SYS REQ
Del (keypad)	Del (keypad)[3]
Delete[1]	Del
End (keypad)	End (keypad)[3]
End[1]	FN-→
Enter (keypad)	Enter
F11[1]	FN-F1
F12[1]	FN-F2
Home (keypad)	Home (keypad)[3]
Home[1]	FN-←
Ins (keypad)	Ins (keypad)[3]
Insert[1]	Ins
Page Down[1]	FN-↓
Page Up[1]	FN-↑
PgDn (keypad)	PgDn (keypad)[3]
PgUp (keypad)	PgUp (keypad)[3]
SysRq	ALT-SYS REQ
→ (keypad)	→ (keypad)[3]
→[1]	→
← (keypad)	← (keypad)[3]
←[1]	←
↓ (keypad)	↓ (keypad)[3]
↓[1]	↓
↑ (keypad)	↑ (keypad)[3]
↑[1]	↑
1, 2, 3, 4, 5, 6, 7, 8, 9, 0, . (keypad)	1, 2, 3, 4, 5, 6, 7, 8, 9, 0, . (keypad)[4]

Notes:

1. Enhanced 101-key keyboard, separate function keys. Older software may not respond to these keys.
2. Must have PAD LOCK function active, or press FN-<key>.
3. Must have one of the following: (1) PAD LOCK active, NUM LOCK off; (2) PAD LOCK off, FN-<key>; (3) NUM LOCK active, PAD LOCK off, SHIFT-FN-<key>; or (4) PAD LOCK off, NUM LOCK off, FN-<key>.
4. Must have one of the following: (1) PAD LOCK and NUM LOCK active; (2) PAD LOCK active, NUM LOCK off, SHIFT-<key>; (3) PAD LOCK off, NUM LOCK active, FN-<key>; or (4) PAD LOCK and NUM LOCK off, SHIFT-FN-<key>.

Chapter 4
Configuration

This chapter describes the MFM-180 Monitor program., which handles all configuration in the MinisPort Portable Computer. For specifications and connector pinouts, refer to Chapter 1 and Chapter 2.

MFM-180, the multifunction monitor in the MinisPort Portable Computer, provides:

- Routines that test the computer when you turn it on.
- The Setup/Configuration program that sets the initial operating parameters of the computer, as well as the time and date for the real-time clock.
- Boot commands to load the operating system into memory from the silicon disk drive or a floppy disk.
- A color bar generator for adjusting colors on an external monitor.
- User-selected tests to more thoroughly test for computer hardware problems.
- Machine language commands that let experienced programmers enter, modify, and test machine-language code.

Entering the MFM-180 Monitor

Use the CTRL-ALT-INS key combination to enter the MFM-180 Monitor. A three-line message similar to the following will appear in the upper-left corner of the screen:

```
MFM-180 Monitor, Version x.xx
Memory Size: 640K
Enter "?" for help.
->_
```

The first line contains the version number of MFM-180. This message also appears whenever the boot configuration is set to "Enter MFM Monitor" and you turn on the computer.

The Monitor prompt (->) indicates MFM-180 is ready to accept commands. Enter the question mark (?) and press the ENTER key to display a summary of the valid commands. The display is similar to Figure 4-1. Table 4-1 describes the symbols used in the syntax.

Figure 4-1. MFM-180 Command Summary

```
                    - MFM-180 Command Summary -

CMD:    Explanation             Syntax
----    -----------             ------
?:      Help                    ?
B:      Boot from disk          B [(B|1|2|3)]
C:      Color Bar               C
D:      Display memory          D [<range>]
E:      Examine memory          E <addr>
F:      Fill memory             F <range>,{<byte>|"<string>"}...
G:      Execute (Go)            G [=<addr>][,<breakpoint>]...
H:      Hex math                H <number1>,<number2>
I:      Input from port         I <port>
M:      Move memory block       M <range>,<dest>
O:      Output to port          O <port>,<value>
R:      Examine Registers       R [<register>]
S:      Search memory           S <range>,{<byte>|"<string>"}...
T:      Trace program           T [<count>]
U:      Unassemble program      U [<range>]
V:      Set Video/Scroll        V [M<mode>][S<scroll>]
        Where <range> is:       <addr>{,:addr>|L<length>}
TEST:   Extended diagnostics    TEST
SETUP:  Define hardware Setup   SETUP
        Copyright (C) 1987, by Zenith Data Systems
->_
```

Table 4-1. Syntax Symbols

ELEMENT	EXAMPLE	DESCRIPTION
Brackets	[like this]	Optional. Enter only if needed.
Braces and bar	{like this | or this}	Choices. Enter only one.
Angle brackets	<like this>	Variable. Enter your value.

The following pages describe the commonly-used functions and programs of MFM-180.

The Setup/ Configuration Program

The Setup/Configuration program sets the operating parameters for the computer. Features you can modify or establish include:

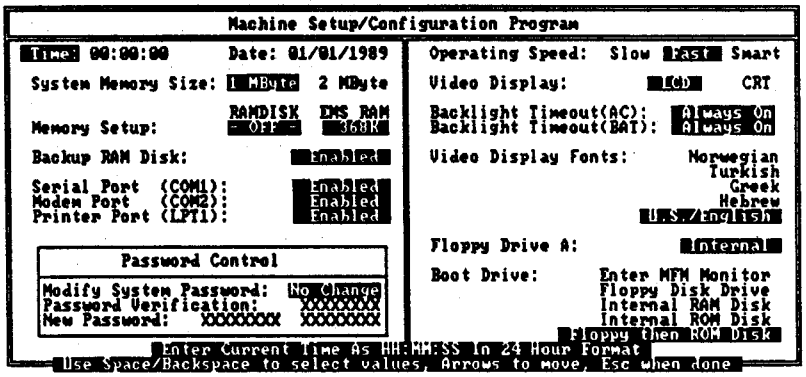
- Time and date
- Amount of memory installed
- Memory allocation between EMS and the silicon disk drive
- Port status (enabled/disabled)
- Password
- Initial CPU operating speed
- Initial video output
- Backlight timeout
- Initial video display font
- Drive A location
- Boot drive

To enter the Setup/Configuration program, you must be in the MFM-180 Monitor and see the prompt (->) on the screen. Then type SETUP and press the ENTER key. Figure 4-2 illustrates the Setup/Configuration screen.

The fields displayed in reverse video are the current settings. The two lines at the bottom of the screen contain instructions for entering information into the fields.

Since the entries are selectable, record the final settings for future reference. The lithium backup batteries maintain this information, but once they run down, you may have to re-enter the setup information.

Figure 4-2. Initial Setup Screen


Machine Setup/Configuration Program
Time: 00:00:00
Date: 01/01/1989
Operating Speed: Slow Fast Smart
System Memory Size: 1 MByte 2 MByte
Video Display: LCD CRT
Memory Setup: RAMDISK - Off - EMS RAM 368K
Backlight Timeout(AC): Always On
Backlight Timeout(BAT): Always On
Backup RAM Disk: Enabled
Video Display Fonts: Norwegian Turkish Greek Hebrew U.S./English
Serial Port (COM1): Enabled
Modem Port (COM2): Enabled
Printer Port (LPT1): Enabled
Password Control
Modify System Password: No Change
Password Verification: XXXXXXXX
New Password: XXXXXXXX XXXXXXXX
Floppy Drive A: Internal
Boot Drive: Enter MFM Monitor Floppy Disk Drive Internal RAM Disk Internal ROM Disk Floppy then ROM Disk
Enter Current Time As HH:MM:SS In 24 Hour Format
Use Space/Backspace to select values, Arrows to move, Esc when done

Use the cursor control arrow keys to move from field to field. As you move, the next to the bottom line will prompt you to enter specific information regarding that field. In Figure 4-2, the line prompts you to enter the time.

With the exception of the Time, Date, and Password fields, use the space bar or BACKSPACE key to move through the settings. Time and date require numeric entries. Password Control requires a specific sequence of entries, explained later in this chapter.

Time and Date

Time — Enter the current time using the 24-hour format: hours (00 – 23), minutes (00 – 59), and seconds (00 – 59). Use leading zeroes for single-digit entries. The cursor automatically advances to the next field — minutes or seconds — as you enter the values.

Enter a value slightly later than the current time; then wait for the time to reach that value and press the ENTER key to start the clock.

Date — Enter the date using the month-day-year numeric format: month (01 – 12), day (00 – maximum for the month selected), and year (1980 – 2099). Enter leading zeroes for single-digit entries and press the ENTER key when you are finished.

If you make an invalid entry, the prompt line informs you of your error and instructs you how to continue.

Memory

The next three lines of entries set up memory allocation and include: System Memory Size, Memory Setup, and Backup RAM Disk settings.

System Memory Size — The two settings establish the amount of memory the computer holds: one or two megabytes. Use the space bar to select the correct entry.

Memory Setup — This field establishes the amount of memory available for silicon disk drive D (designated RAMDISK on the screen) and EMS RAM. A one-megabyte computer will let you configure a total of 368K to the two fields. A computer upgraded to two megabytes will let you configure a total of 1392K.

Unless programs are run that require EMS memory, configure all the memory to the RAMDISK field. Use the space bar or BACKSPACE key to change the values in the two fields.

If there are specific EMS memory requirements, configure the minimum required EMS memory and leave the rest for silicon disk drive D. Running application programs from the silicon disk drive instead of a floppy disk extends the duty cycle of the battery pack.

Backup RAM Disk — This field sets the computer up to retain the silicon disk drive's contents when off. Select "Enabled" to retain the contents of the silicon disk drive when you turn off the computer or change the battery pack.

NOTICE New backup lithium batteries can provide up to three days of backup power to the silicon disk drive (with the battery pack removed). If you use largely depleted lithium batteries, you may have only a few moments of backup power available to maintain the silicon disk's contents.

Port Control

The next three lines in the Setup screen are part of the power management system in the computer. If you do not require use of a port, disable the feature. This turns off power to the affected circuits and provides a longer duty cycle for the computer.

NOTE: The disable feature for port control is used only during battery operation. When operating with the AC adapter, the ports are always enabled. This feature is checked only at bootup. If you use AC during bootup and then disconnect the AC adapter, you must reboot on battery power.

Serial Port (COM1) — This is the RS-232 port on the back of the computer. To use the FWL utility (FastLynx LX) for transferring data, enable this port.

Modem Port (COM2) — This is the optional modem that can be installed in the computer. If there is no modem, disable this port.

Printer Port (LPT1) — This is the parallel printer port on the back of the computer. If there is no printer, disable this port.

Operating Speed

The computer has the option of running software at Slow, Fast, or Smart speeds. Most software will run properly at the Fast speed.

However, some software may not run properly at the Fast speed. You have two options: (1) run all software at 4.77 MHz (Slow), (2) run only disk input and output at the slower speed. If you choose the first option, select Slow. If you choose the second option, select Smart.

MS-DOS provides the option of changing the operating speed from a batch file or as a keyboard command. Refer to MS-DOS documentation and the MACHINE command for information on how to use the operating system to select the operating speed.

Display Options

The next four fields specify video operation.

Video Display — You can connect an external RGB color monitor through the CRT connector on the back of the computer. To use the external monitor all the time, change the video display setting to CRT. If you are not using an external monitor, select LCD.

Backlight Timeout (AC) — When powering up with an external power source, this setting establishes the backlight timeout while you operate the computer. Timeout options include Always On, Always Off, and any 1-minute value between 1 and 59 minutes. Normally, you do not have to conserve power, so select Always On.

Backlight Timeout (DC) — When powering up using the battery pack, this setting establishes the backlight timeout. To maximize the duty cycle of the battery pack, turn the backlight to Always Off if you have a lot of ambient light, or keep the setting to a minimum (1 – 5 minutes).

The timeout value establishes the amount of time between the last keyboard entry and the backlight turning off. If you are reading a lot of information from the screen, make the timeout period longer. If you are not using the screen except to make keyboard entries, keep the timeout short.

MS-DOS also gives you the option of changing the backlight timeout from a batch file or as a keyboard command. Refer to MS-DOS documentation and the MACHINE command for information on how to use the operating system to change the backlight timeout feature.

NOTE: After the backlight turns off, any key press turns it on again.

Video Display Fonts — The Video Display Fonts field allows you to select a custom character set for a specific language. To use the custom character set you select, your application program must also support the specified language. The default setting for this field is U.S./English.

Disk Options

The next two fields establish drive A's location and the boot drive.

Floppy Drive A — The computer provides the option of setting up drive A as the external floppy disk drive. If you run software that requires you to operate from, or have access to, a 3.5-inch or 5.25-inch disk in drive A, attach the proper external disk drive and select External for this field. Otherwise, select Internal.

Boot Drive — The setting selected for this field establishes the disk drive used to load the operating system. You can disable the boot drive entirely and boot the operating system manually. The following describes each option and its typical use:

- Enter MFM Monitor. Select this option if you do not want to boot the operating system automatically. Whenever you turn on the computer, the Monitor program opening message appears on the screen.
- Floppy Disk Drive. Select this option to boot the operating system automatically from the floppy disk drive. Also, use this option to boot a copy-protected disk from an external 5.25-inch or 3.5-inch floppy disk drive.
- Internal RAM Disk. Select this option to boot the operating system from silicon disk drive D automatically. Before you can use drive D, you must specify memory for it in the Memory Setup field and then format it using MS-DOS.
- Internal ROM Disk. Select this option to boot the operating system from silicon disk drive C (the read-only silicon disk). If there is an "autoexec" batch file on the internal RAM disk (drive D), it runs after the operating system boots. Also, any "config.sys" file on drive D will be read at this time. When the "autoexec" file terminates, control returns to drive C.

- Floppy then ROM Disk. Select this option to check drive A for a disk, then boot from drive C if no disk is installed.

  NOTE: If you use a formatted non-system disk in drive A, the computer will lock up and display the "Non-system disk" message. You must use a bootable disk in drive A or leave the drive empty.

Password Control

The computer provides two security features: a bracket for securing the computer to a desk (shown in Figure 2-2), and Password Control to prevent unauthorized use. Password features are described in this section.

The computer is shipped from the factory with no password installed. Once a password is established, it must be entered before computer access is possible.

NOTICE The computer stores the password in a non-volatile memory IC. If the password is forgotten, the IC must be replaced.

The password control block contains three fields: modify, verify, and new.

Modify — The Modify System Password field provides two choices: No Change and Password.

- If you leave the choice at No Change, you cannot make any changes to the password.
- If you select Password, you can enter or change the password.

Verify — Use the Password Verification field to enter the old password, if one exists. If there is no password, skip this field by pressing ENTER.

New — Use the two fields in the New Password section to enter and retype the new password.

Entering a Password for the First Time

1. Use the arrow keys to move to Modify System Password and select Password.
2. Press the ENTER key. This selects Password, and the highlight moves to Password Verification. Since there is no password installed, press the ENTER key again to move to the first field in the New Password section.

3. Type the new password, keeping the following in mind:

   - Passwords are limited to eight characters or less.
   - Use any alphanumeric character, including punctuation and the space bar.
   - If you inadvertently press a control key (other than the ENTER key), the computer will beep.
   - Do not use the SHIFT key or CAPS LOCK. They will work, but are ignored.
   - As you type the password, the cursor moves through the Xs, providing a visual indication of your location. For security reasons, the password will not appear.

4. Press the ENTER key to move to the second field.

5. Retype the new password. Enter the password exactly as you entered it the first time.

6. Press the ENTER key.

   If you type the password the same both times, the computer prompts you to press ENTER to install the new password, or ESC to quit. Proceed to step 7.

   If you did not type the password the same both times, the computer displays an error message, telling you that you entered the incorrect password. If you are not sure how you entered the password, press ESC twice and return to step 1.

   If you know you mistyped the password the second time, or are not sure, press ESC once. Control will move to the beginning of the second set of Xs. Return to step 5.

7. Press ENTER again. The password is now installed and control returns to the Modify System Password field.

Changing the Password

1. Use the arrow keys to move to Modify System Password and select Password. Press ENTER to move to the Password Verification field.

2. Enter the old password and press the ENTER key. The highlight moves to the first New Password field.

3. Type the new password and press the ENTER key. As you type the password, the cursor moves through the Xs, providing a visual indication of your location.

4. Retype the new password. If you typed the password the same both times, the computer prompts you to press ENTER to install the new password, or ESC to quit. Proceed to step 5.

If you did not type the password the same both times, the computer displays an error message, telling you that you entered the incorrect password. Press ESC twice and return to step 1.

If you know you mistyped the password the second time, or are not sure, press ESC once. Control will move to the beginning of the second set of Xs. Return to the beginning of this step.

5. Press ENTER again. The new password is now installed and control returns to the Modify System Password field.

Disabling the Password

1. Use the arrow keys to move to Modify System Password and select Password.
2. Enter the old password and press the ENTER key. The highlight moves to the first New Password field.
3. Press the ENTER key three times. This enters a null password into the computer.

Exiting the Setup Program

1. When you finish making entries in the Setup/Configuration program, press the ESC key.
2. The computer will ask, "Are you done making changes?"
3. If you have more changes to make, press the N key. Use the arrow keys to move to the section you need to change.

   If you are finished, press the Y key.
4. The computer will tell you to, "Press Return to save changes or Esc to ignore changes."

   This gives you a final option of canceling any changes you have made. If you want to cancel the changes, press ESC.

   If you want the changes you made to take effect, press ENTER.
5. If you made **any** change to the RAMDISK field, the computer will tell you, "All RAM disk data will be lost. Do you want to continue?" All information in silicon disk drive D will be erased.

   If you do not want to continue, press the N key. Control will return to the Memory Setup fields.

   If you want to make the changes, press the Y key.
6. The screen will clear and all changes will take effect, including the password. After a few moments, the computer executes the autoboot routine, according to the instructions provided in the Setup/Configuration program.

Boot Command

Use the boot command to manually boot an operating system from one of the computer's disk drives. The following explains each option:

BF0 — Boots from floppy disk drive A, normally the built-in 2-inch floppy disk drive. If you specified External for floppy drive A in the Setup/Configuration program, the computer attempts to boot the operating system from the external floppy disk drive. Several disk conditions can affect the results of this command:

- No disk installed — Results in a "drive not ready" error message. Press ESC to return to the Monitor program.
- Unformatted or bad disk in drive A — Results in a "sector not found" or "invalid address mark" error message. Press ESC to return to the Monitor program.
- Formatted data disk in drive A — Results in a "non-system disk" error message. Use CTRL-ALT-INS to return to the Monitor program.
- Formatted system disk in drive A — Results in booting the operating system.
- No disk drive attached (refers to the external disk drive only) — Results in a "seek failure" error message. Press ESC to return to the Monitor program.

BF1 — Boots from floppy disk drive B, normally the external floppy disk drive. If you specified External for floppy drive A in the Setup/Configuartion program, the computer will attempt to boot the operating system from the built-in 2-inch disk drive.

BF2, BF3 — These commands, although a part of MFM-180, are not supported in this computer.

BW0 — Boots from silicon disk drive C. If there is an "autoexec" batch file on silicon disk drive D, it will execute and then return control to drive C.

BW1 — Boots from silicon disk drive D. Several conditions can exist that affect this command:

- No disk space allocated — Results in a "sector not found" error message. Press ESC to return to the Monitor program.
- Disk space allocated, but not formatted — Results in a "Not a bootable partition" error message. Press ESC to return to the Monitor program.
- Disk space allocated and formatted for a data disk — Results in a "Non-system disk" error message. Use CTRL-ALT-INS to return to the Monitor program.
- Disk space allocated and formatted for a system disk — Results in booting the operating system.

Video Commands

The color bar command allows you to display a gray-scale or color bar pattern on the screen.

If you are using the built-in LCD, the pattern will be a set of gray-scale bars. Use the FN-F8 and FN-F9 to toggle through the LCD palettes to obtain the display you want.

If you are using an external color RGB monitor, the pattern will be the RGB and intensified RGB colors. Use the color bar pattern to adjust the brightness, contrast, and colors on the monitor (not all RGB monitors will allow you to adjust the tint and color intensity).

The Set Video/Scroll commands in MFM-180 allow testing of certain features of the computer. Video modes 0, 1, 4, and 5 result in 40-character displays. Video modes 2, 3, and 6 result in 80-character displays. The scroll modes are not used in this computer.

Testing the Computer

Every time the computer power is turned on, the Monitor program performs a series of self-tests to make sure the computer is ready to function. If the tests detect a malfunction, the computer displays one or more error messages.

The Monitor program also contains more extensive tests. To display the test program menu, type TEST while in the Monitor program and then press ENTER. The test menu appears on the screen. Refer to the computer Owner's Manual for more information about each of the tests contained in the Monitor program.

Programming the Computer

The Monitor program also contains a set of assembly language commands. These commands allow experienced programmers to test procedures and routines, examine memory and register contents, and troubleshoot and modify programs at the machine level. Table 3-2 lists the commands available and provides a brief description of each.

Use these commands **only** if you are familiar with assembly level programming and microprocessor architecture.

Table 3-2. Assembly Language Commands

Command	Syntax	Description
Display memory	D<address>	Displays contents of 128 bytes of memory beginning at specified address.
	D<address> L<bytes>	Displays contents of the specified number of bytes of memory beginning at specified address.
	D<range>	Displays contents of the specified block of memory.
Examine memory	E<address>	Displays and allows user to alter the contents of the specified memory location.
Fill memory	F<range>,<data byte>	Enters the specified data byte into each memory location in the specified memory block.
	F<range>,"<ASCII string>"	Enters the specified ASCII string into the specified memory block.
Execute (Go)	G=<address>	Begins execution of instructions at the specified address.
	G=<address>,<breakpoint>	Begins execution of instructions at the specified address and halts at the breakpoint.
Hex math	H<number1>,<number2>	Displays the sum and the difference of the two specified hexadecimal numbers.
Input from port	I<port address>	Displays the contents of the specified port.
Move memory block	M<range>,<destination>	Copies the contents of the specified memory block to the destination memory location.
Output to port	O<port address>,<data>	Writes the specified data to the specified port address.
Examine Registers	R<register name>	Displays the contents of the specified CPU register and allows modification of its contents.
Search memory	S<address>L<bytes>,<data>	Searches the specified memory block for the specified data byte and displays the address where the data was found.
	S<range>L<bytes>,"<ASCII>"	Searches the specified memory block for the specified ASCII character or string and displays the address where the character was found.
Trace program	T<count>	Executes a specified number of lines of an assembled program in single-step mode.
Unassemble program	U<range>	Displays in assembly-language format the mnemonics and hexadecimal codes for the specified memory block.

Chapter 5
Disassembly

This chapter contains disassembly instructions for the computer. Follow these procedures in reverse order when reassembling the computer.

To avoid any shock hazard, make sure the power switch is OFF and disconnect the external AC adapter before disassembling the computer. Also disconnect and remove all external cables, including those that connect to telephones, telephone lines, and peripherals.

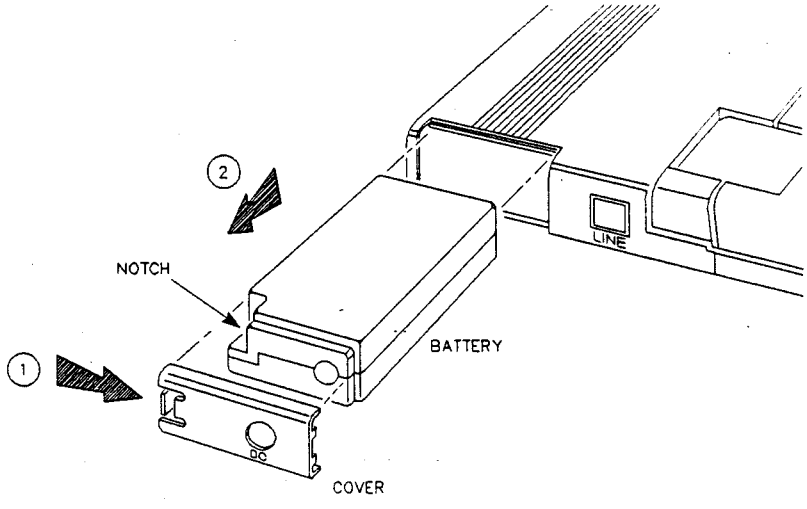
Batteries

Removing the battery pack and back-up batteries consists of removing their respective covers, then removing the batteries.

Battery Pack

1. Remove the battery pack cover by pushing in the tab as shown in Figure 5-1.
2. Use the notch and remove the battery pack by sliding it out of the computer.

Figure 5-1. Battery Pack Removal

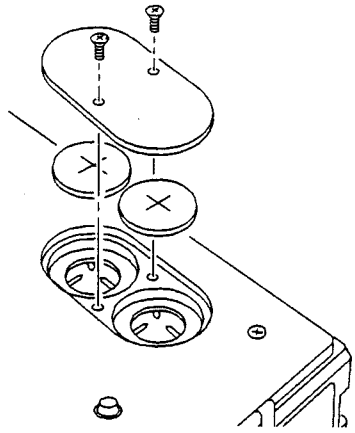


Back-up Batteries

1. Place the computer face down on a soft, clean surface.
2. Remove the two screws as shown in Figure 5-2.
3. Remove the batteries from the computer.

NOTICE Observe the polarity when replacing the back-up batteries. Improper installation of the batteries could result in damage to the batteries and/or the computer.

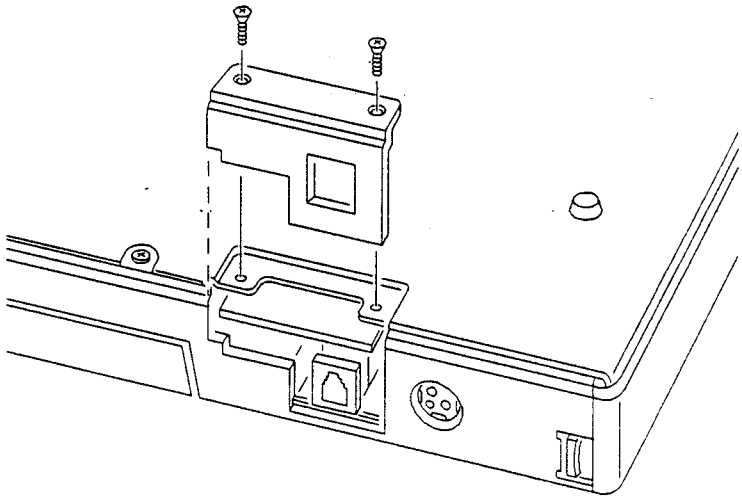
Figure 5-2. Replacing Back-up Batteries



Modem

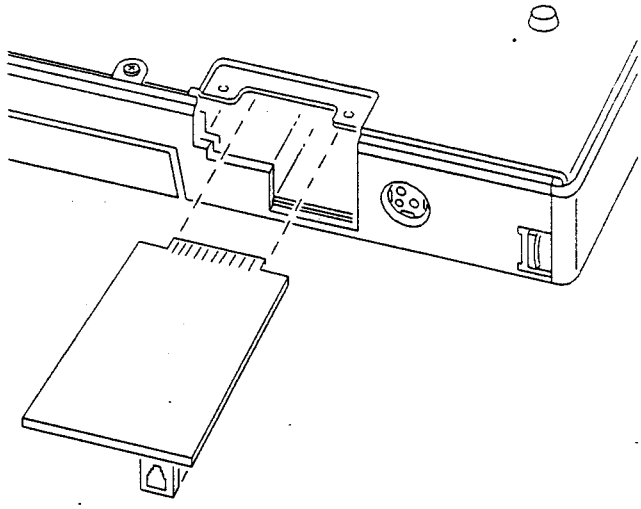
1. Remove the two screws that attach the modem cover to the chassis as shown in Figure 5-3.
2. Lift the modem cover from the computer.

Figure 5-3. Modem Cover Removal



3. Remove the modem card by sliding it out of the computer as shown in Figure 5-4.

Figure 5-4. Modem Removal

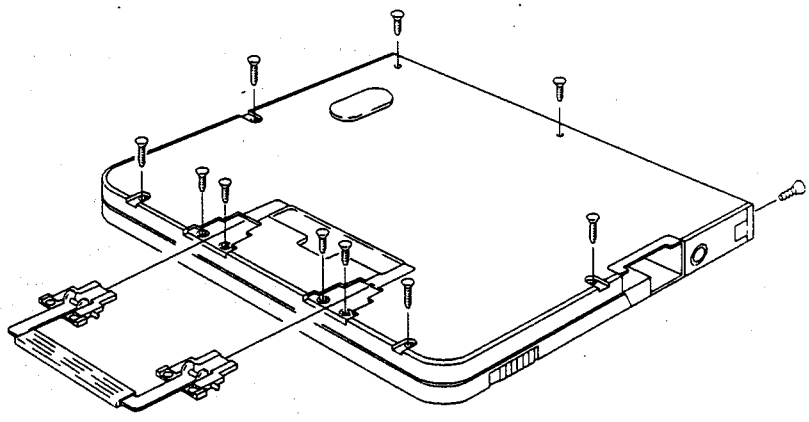


Base Unit

1. Remove the ten screws on the bottom of the chassis, as well as the screw located in the rear of the unit, as shown in Figure 5-5.

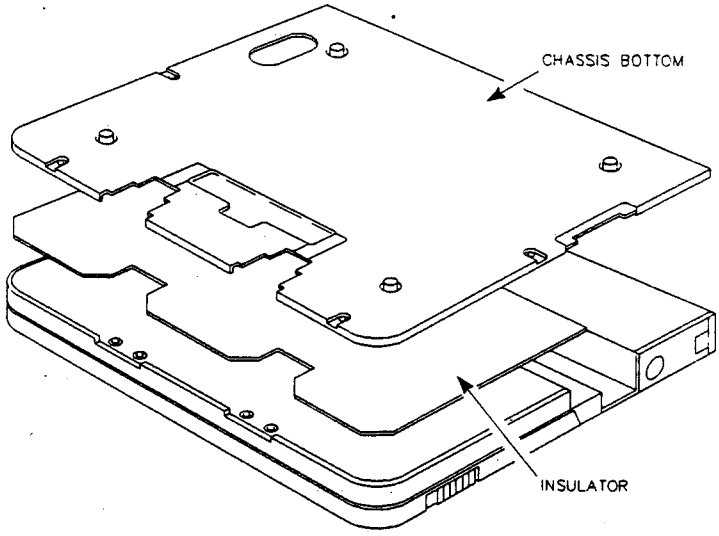
2. If removing the built-in carrying handle, simply slide it off the chassis bottom.

Figure 5-5. Removing the Base Unit Screws



3. Lift the chassis bottom and the insulator free from the base unit, as shown in Figure 5-6. (The insulator may be attached to the chassis bottom.)

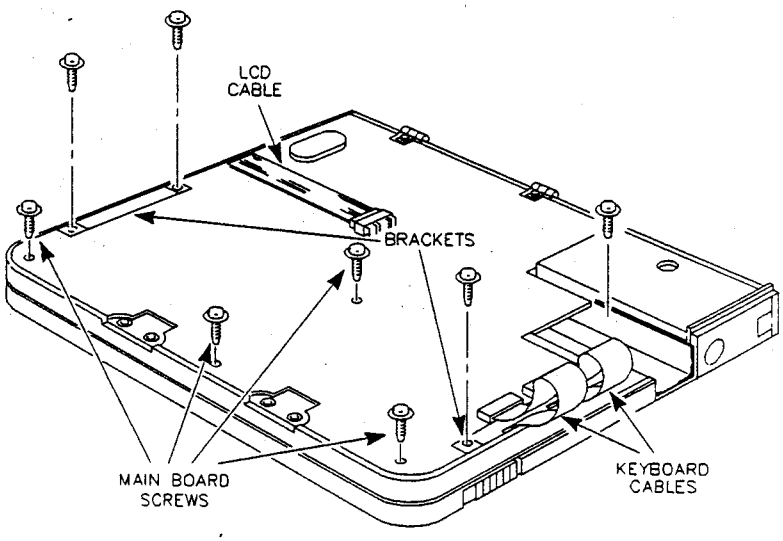
Figure 5-6. Chassis Bottom and Insulation Removal



Main Board

1. Disconnect the two keyboard cables and the LCD cable, as shown in Figure 5-7.
2. Remove the four screws holding the main board in place.
3. Remove the two screws and bracket on each side of the main board.

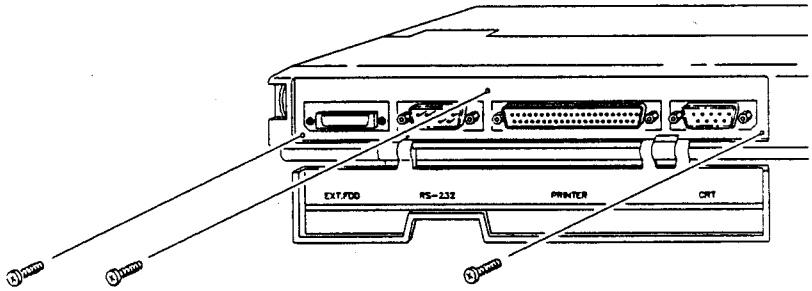
Figure 5-7. Disconnecting the Main Board



4. Remove the three screws located near the external ports in the rear of the unit, as shown in Figure 5-8.

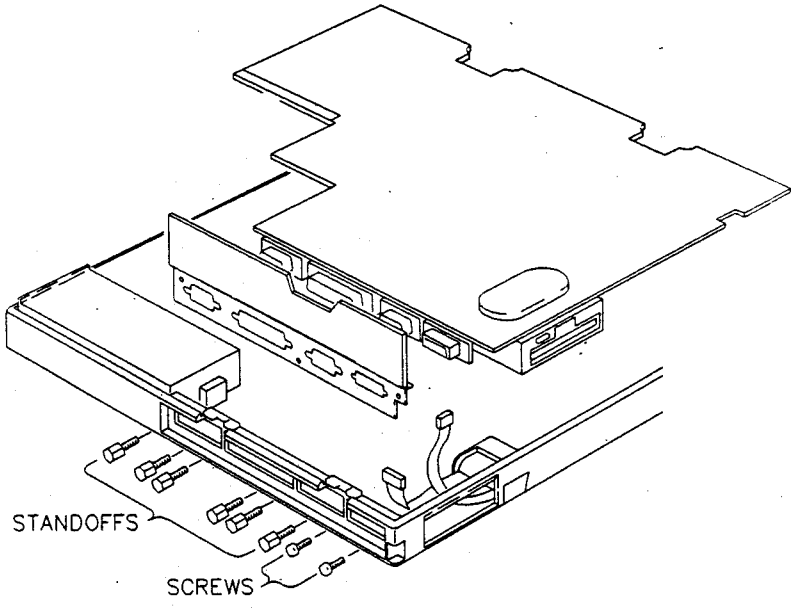
5. To free the main board, lift the board from the front while gently pushing in at the rear of the unit.

Figure 5-8. Main Board Screw Removal



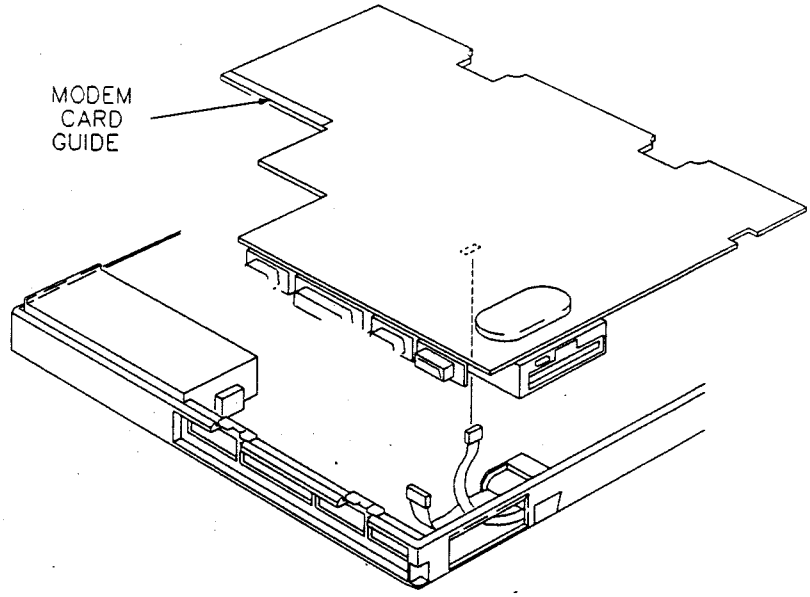
6. Detach the shield connected to the external ports by removing the six standoffs and two screws (two for each port), as shown in Figure 5-9.

Figure 5-9. Main Board Exploded View



7. When removing the main board, disconnect the four-conductor cable under the main board, as shown in Figure 5-10. The modem card guide is attached to the main board; do not lose it.

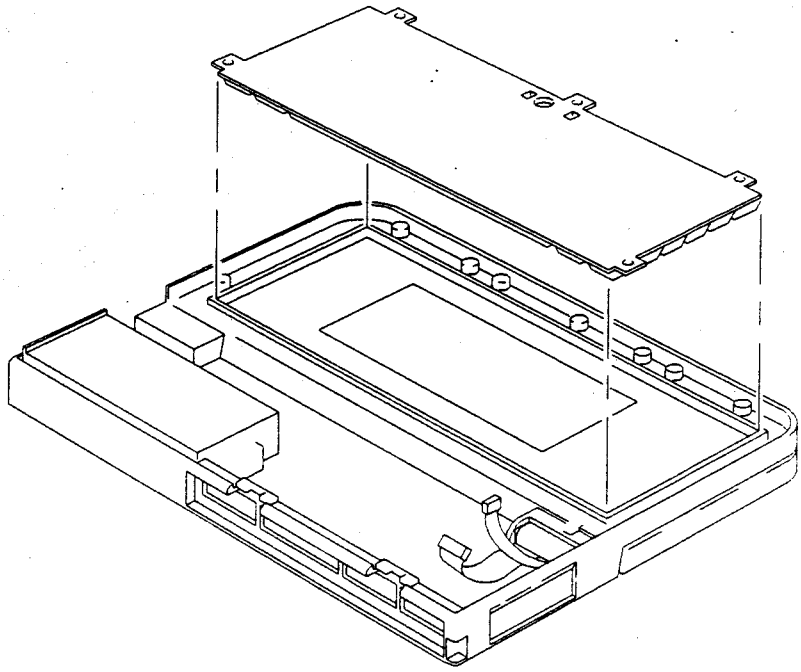
Figure 5-10. Removing the Main Board



Keyboard

1. To remove the keyboard, lift it up and out of the computer as shown in Figure 5-11.

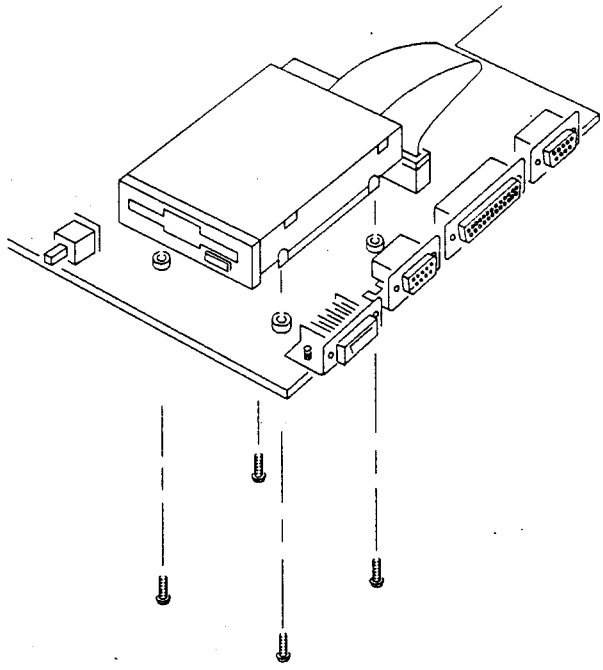
Figure 5-11. Keyboard Removal



Disk Drive

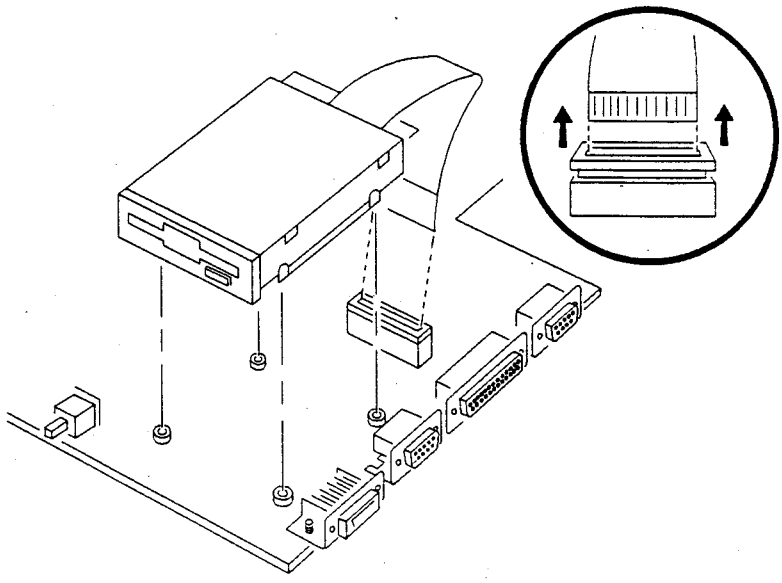
1. To free the disk drive from the main board, remove the four screws on the component side of the board, as shown in Figure 5-12.

Figure 5-12. Freeing the Disk Drive



2. Using a small, flat-bladed screwdriver, disconnect the disk drive cable from the main board, as shown in Figure 5-13.

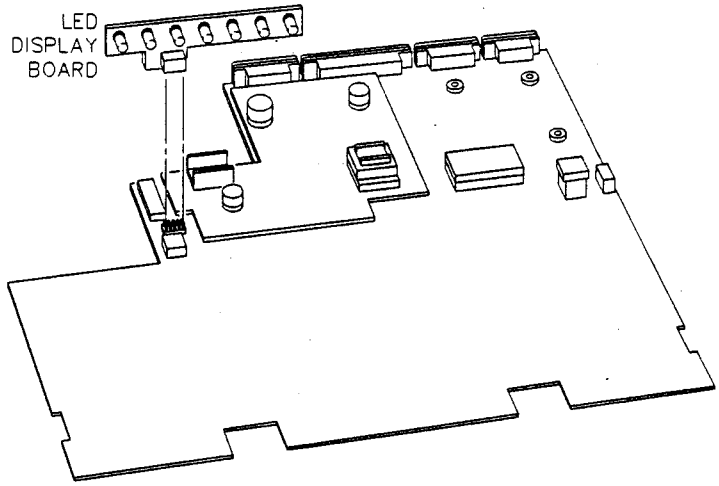
Figure 5-13. Disk Drive Removal



LED Display Board

1. Remove the LED display board by lifting it up and off the connector as shown in Figure 5-14.

Figure 5-14. LED Display Board Removal

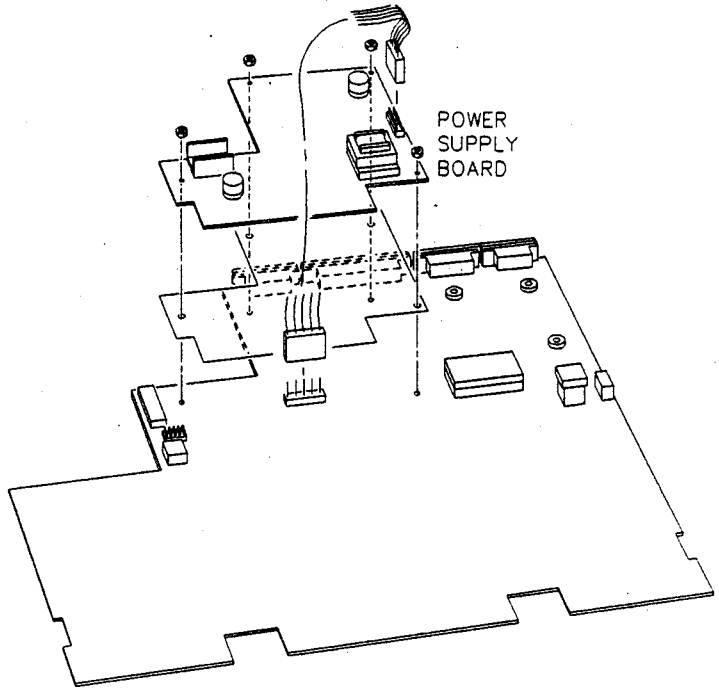


Power Supply Board

1. Detach the power supply board from the main board by removing the four screws on the component side of the power board, as shown in Figure 5-15.

2. Disconnect the cable on the power supply board.

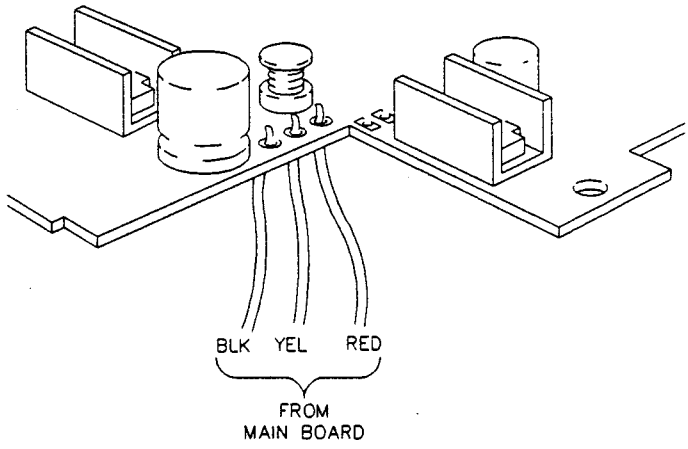
Figure 5-15. Removing the Power Supply Board



3. Desolder the black, red, and yellow wires on the foil side of the power board, as shown in Figure 5-16. (Observe the location of each wire for proper reconnection.)

4. Lift the power board and insulation off the four standoffs on the main board.

Figure 5-16. Desoldering Power Supply Board Wires



Chassis

Chassis disassembly consists of battery compartment removal, opening the top subassembly, and separating the top and bottom subassemblies.

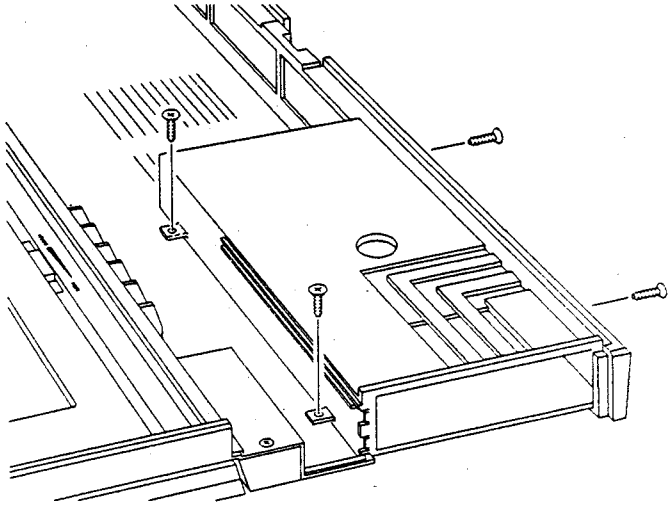
Battery Compartment

1. Remove the two screws in the rear of the unit as shown in Figure 5-17.

2. Remove the two screws on the inside of the chassis.

3. Lift the battery compartment free of the chassis.

Figure 5-17. Battery Compartment Removal



Top Subassembly

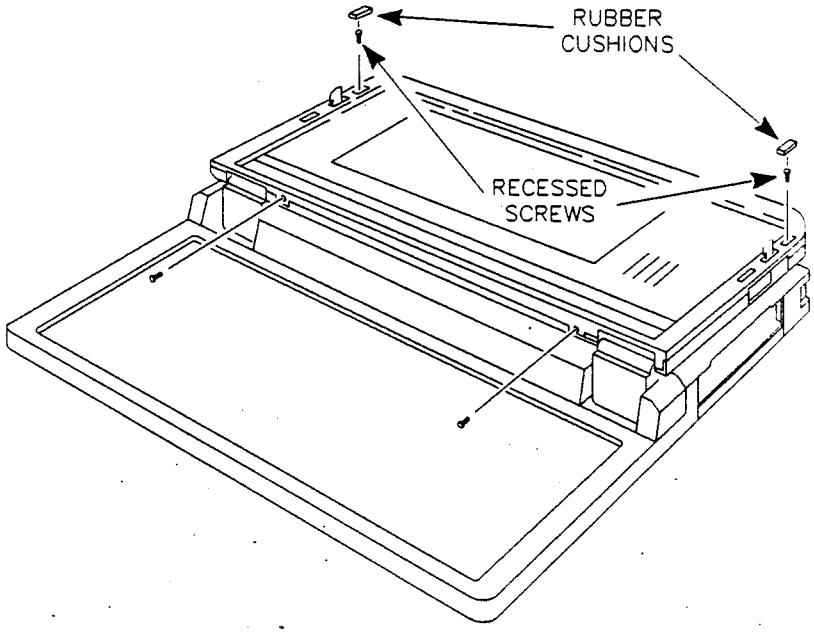
1. Position the computer as illustrated in Figure 5-18, with the LCD display tilted back as far as possible.

2. Remove the two screws underneath the top subassembly.

3. Using a small flat-bladed screwdriver or needle-nosed pliers, extract the two rubber cushions located just above the door latches.

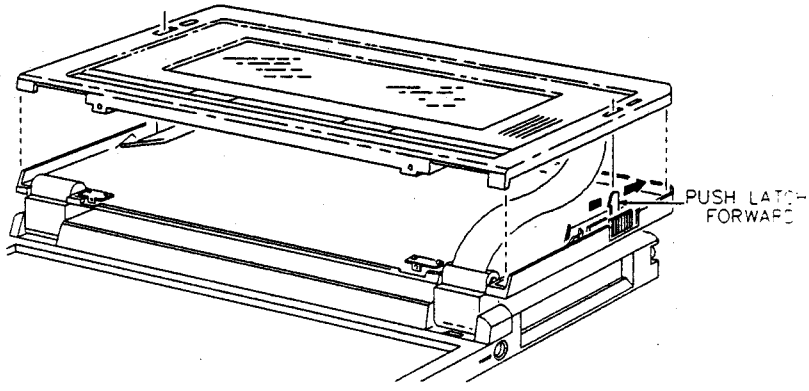
4. Remove the two screws recessed in the top subassembly. (Be sure to use a small phillips screwdriver or the chassis may be damaged.)

Figure 5-18. Disassembling the Top Subassembly



5. Insert a flat-bladed screwdriver between the two halves of the top subassembly and separate them as shown in Figure 5-19. (Push the door latches forward to free the two halves.)

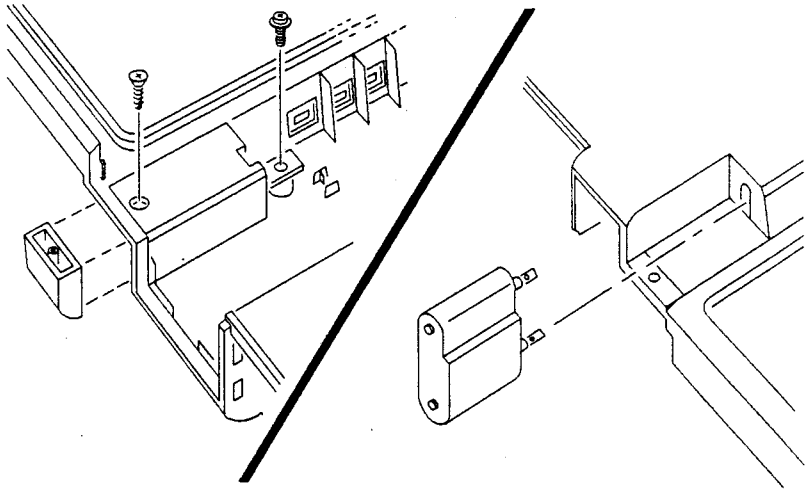
Figure 5-19. Opening the Top Subassembly



Separating the Top and Bottom Subassemblies

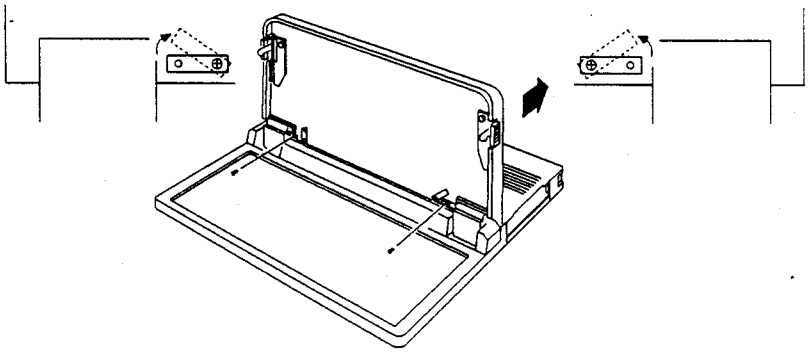
1. Position the unit with the inside-bottom of the chassis facing upward, as shown in Figure 5-20.
2. Remove the four hinge assembly screws.
3. Remove the two hinge blocks.

Figure 5-20. Hinge Disassembly



4. Position the unit as shown in Figure 5-21.
5. Remove the two outside screws on the two hinge retainers.
6. Loosen the two inside screws to allow the hinge retainers to swing freely.
7. Remove the two hinge assemblies holding the top and bottom subassemblies together.

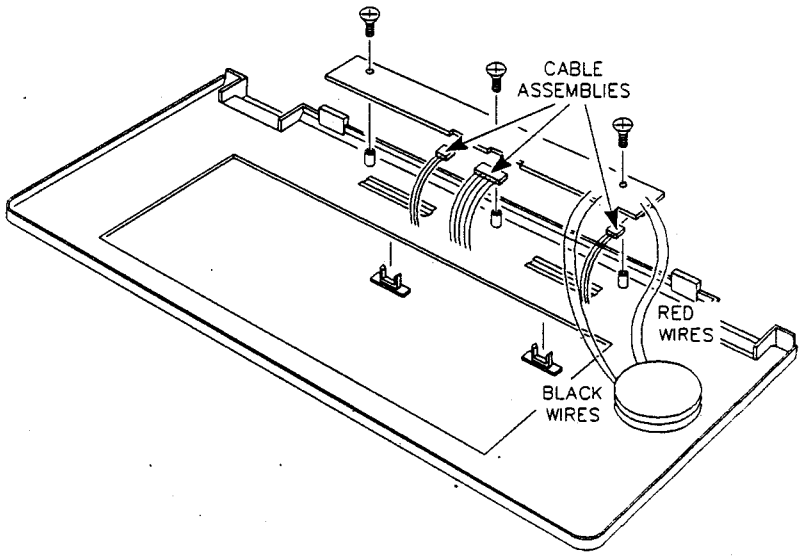
Figure 5-21. Separating the Subassemblies



Brightness/Contrast Board

1. Remove the three screws that attach the brightness/contrast board to the inside of the top subassembly, as shown in Figure 5-22.
2. Desolder the two red wires and the two black wires. (Observe the location of each wire for proper reconnection.)
3. Disconnect the three cable assemblies from the brightness/contrast board.
4. Remove the brightness/contrast board by lifting the top of the board away from the chassis and free of the computer.

Figure 5-22. Brightness/Contrast Board Removal

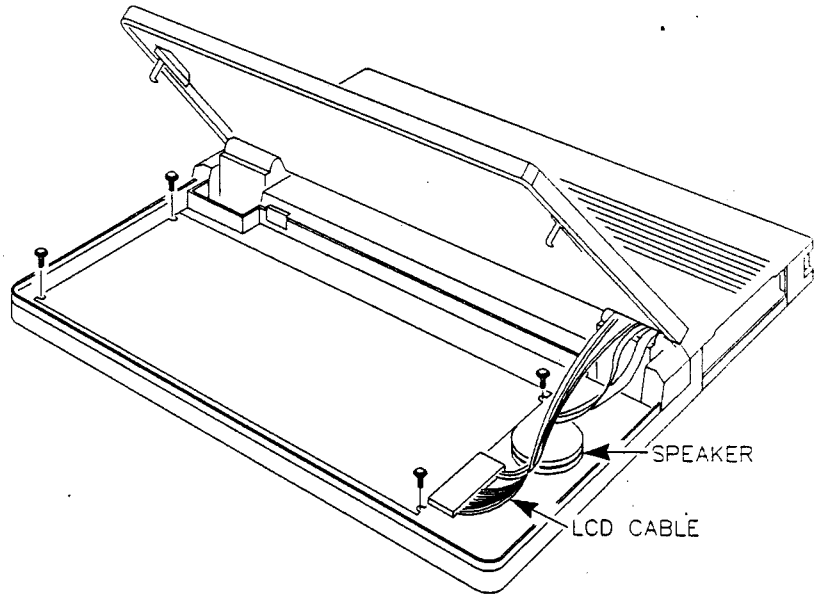


LCD Display

1. Remove the four screws holding the LCD display to the chassis as shown in Figure 5-23.

2. Disconnect the LCD cable assembly from the LCD board.

Figure 5-23. LCD Display Removal



3. Desolder the two black wires from the brightness/contrast board. (These two wires may already have been desoldered if the brightness/contrast board was removed earlier. Refer to Figure 5-22.)

4. Remove the speaker from it's retainer if it needs replacement.

Chapter 6
Troubleshooting

This chapter provides information on troubleshooting the MinisPort Portable Computer. Procedures are provided to diagnose most faults to the major assembly level.

Preliminary Checks

Before turning on the computer, open it, and inspect the following:

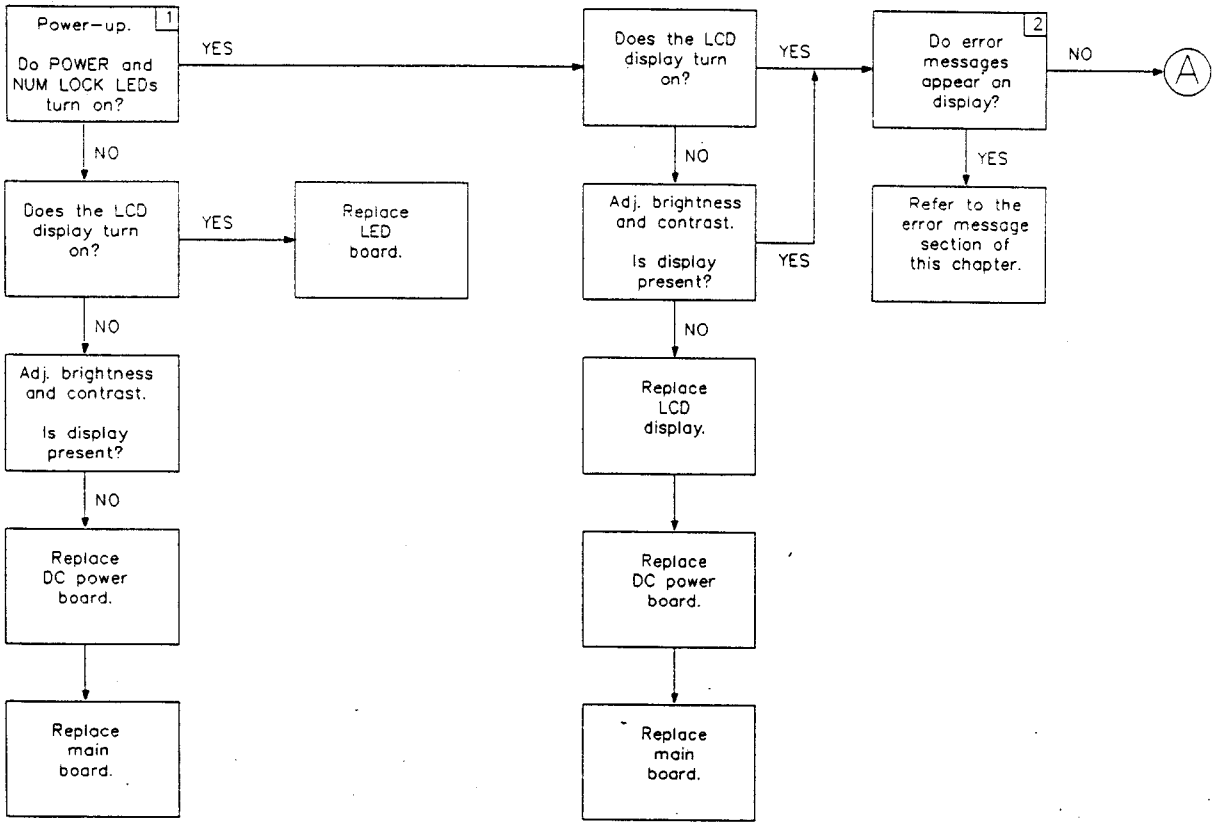
- Make a visual inspection. Replace any damaged parts.
- Check all cables for proper connection.
- Verify the external DC power supply and battery pack are functional.

Refer to Chapter 4, "Configuration," for proper configuration setup.

Troubleshooting

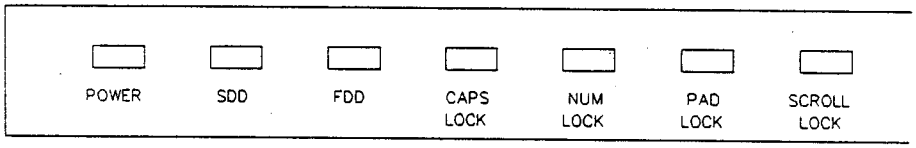
Figure 6-1 contains troubleshooting steps for this computer. This chart will direct you to replace a part. If the information provided does not correct the problem, proceed with part replacement until the problem is corrected.

Figure 6-1. General Troubleshooting Chart

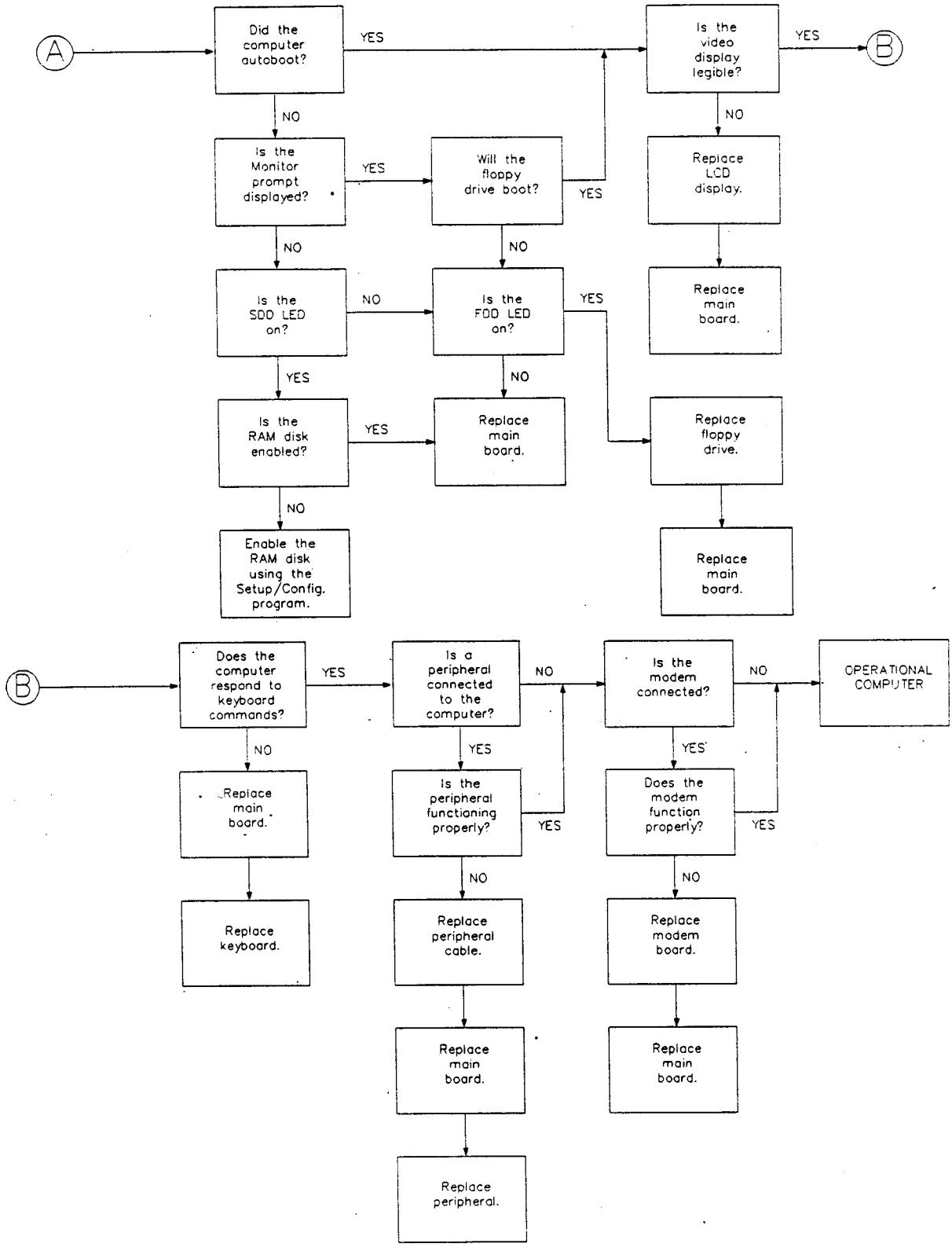


NOTES:

1. The POWER LED should be amber if using the external power supply, and green if using the battery pack only.
2. Verify proper configuration using the Setup/Configuration program.



KEYBOARD INDICATOR LEDS


A
Did the computer autoboot?
YES
Is the video display legible?
YES
B
NO
NO
Is the Monitor prompt displayed?
YES
Will the floppy drive boot?
YES
Replace LCD display.
NO
NO
Is the SDD LED on?
NO
Is the FDD LED on?
YES
Replace main board.
YES
NO
Is the RAM disk enabled?
YES
Replace main board.
Replace floppy drive.
NO
Enable the RAM disk using the Setup/Config. program.
Replace main board.
B
Does the computer respond to keyboard commands?
YES
Is a peripheral connected to the computer?
NO
Is the modem connected?
NO
OPERATIONAL COMPUTER
NO
YES
YES
Replace main board.
Is the peripheral functioning properly?
YES
Does the modem function properly?
YES
NO
NO
Replace keyboard.
Replace peripheral cable.
Replace modem board.
Replace main board.
Replace main board.
Replace peripheral.

Disk-Based Diagnostics

An optional disk-based diagnostics package is available for this computer. The disk-based diagnostics provide a more extensive and detailed series of tests for the computer. The tests are configurable and allow specific detailed testing of the computer.

Error Messages.

If the computer encounters any problems during self-tests or power up, it displays a message on the screen. The following section lists the error messages alphabetically, describes the probable cause(s), and lists corrective action(s).

Bad disk controller!

This message occurs if a disk drive cable is damaged or not securely connected, or if a hardware failure occurs.

Corrective action:

- Replace disk drive cable.
- Replace the floppy disk drive.
- Replace the main board.

CPU failure!

The CPU may be defective. This message may also appear if the computer was turned off, and then on again very quickly.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again.
- Replace the main board.

CRC error!

This message means that an unrecoverable read error has occurred.

Corrective action:

- Try using another disk.
- Replace the floppy disk drive.
- Replace the main board.

Disk not bootable!

This message usually appears whenever an unformatted or non-MS-DOS disk is attempting to boot.

Corrective action:

- Try booting another disk.
- Replace the floppy disk drive.
- Replace the main board.

Divide by zero!

Either the computer was turned off, and then on again very quickly, or software set up a divide by zero condition that was improperly handled.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again.
- Try another copy of the software.
- Replace the main board.

DMA overrun!

This message indicates a DMA-related hardware failure.

Corrective action:

- Replace the main board.

Drive not ready!

This message indicates either the disk is not fully inserted into the disk drive, or you are trying to access a drive that does not exist, or is not properly connected.

Corrective action:

- Fully insert the disk into the disk drive.
- Verify the drive is properly connected and is a valid drive.
- Replace the disk drive cable.
- Replace the floppy disk drive.
- Replace the main board.

ERROR: RAM Disk Failure!
Errors found! Please press <Esc> to continue

This message is normal after replacing the back-up batteries, or may indicate a memory-related failure.

Corrective action:

- Use the Setup/Configuration program to re-enter configuration information.
- Replace the main board.

Internal Stack Failure, System Halted!

An unexpected error or memory failure has occurred during program execution.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again. Run the program again.
- Try another copy of the software.
- Replace the main board.

Invalid address mark detected!

This message usually indicates an unformatted or damaged disk is being used.

Corrective action:

- Try using another disk.
- Replace the floppy disk drive.
- Replace the main board.

Invalid data read!

This message usually indicates an unformatted or damaged disk is being used.

Corrective action:

- Try using another disk.
- Replace the floppy disk drive.
- Replace the main board.

Invalid/No keyboard code received!

The computer does not see the keyboard.

Corrective action:

- Replace the keyboard.
- Replace the main board.

Keyboard not responding or not connected!

The computer does not see the keyboard.

Corrective action:

- Replace the keyboard.
- Replace the main board.

Memory Parity Failure!

The power-up tests detected a memory parity error.

Corrective action:

- Replace the main board.

Non-maskable interrupt

This error indicates either a program execution error or power supply interruption.

Corrective action:

- Try running the program again.
- Replace the main board.
- Replace the power board.

No system

The computer is attempting to boot an unformatted disk.

Corrective action:

- Try booting another disk.
- Replace the floppy disk drive.
- Replace the main board.

Not a bootable partition

The computer is attempting to boot an unformatted drive D (silicon disk drive), or drive D formatted without an operating system. Refer to the computer *Owner's Manual* for information regarding the silicon disk drive.

Corrective action:

- Boot from drive C (ROM disk), or a bootable floppy disk.
- Replace the main board.

Overflow!

Either a power-up test failed, or the computer was turned off, and then on again very quickly.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again. Run the program again.
- Replace the main board.

Parity failure!

The power-up tests detected a memory parity failure.

Corrective action:

- Replace the main board.

Parity hardware failure!
Address: xxxx:yyyy, Bit: n, Chip: Uxxx

The power-up tests detected a memory parity failure.

Corrective action:

- Replace the main board.

Please replace the backup battery!
Bad configuration information found in CMOS!!
Errors found! Please press <Esc> to continue

This message is normal after back-up battery replacement, or it could indicate a back-up battery failure.

Corrective action:

- Use the Setup/Configuration program to re-enter configuration information.
- Replace the back-up batteries.
- Replace the main board.

RAM failure! Address: xxxx:yyyy, Bit: n, Chip: Uxxx

The power-up tests detected a memory failure.

Corrective action:

- Replace the main board.

ROM checksum failure!

This message indicates that one or more of the ROMs is not functioning correctly. This message may also appear if the computer was turned off, and then on again very quickly.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again. Run the program again.
- Replace the main board.

Sector not found!

This message usually indicates an unformatted or damaged disk is being used.

Corrective action:

- Try using another disk.
- Replace the floppy disk drive.
- Replace the main board.

Seek failure!

This message usually indicates an unformatted or damaged disk is being used. .

Corrective action:

- Try using another disk.
- Replace the floppy disk drive.
- Replace the main board.

System memory size incorrect!

This message indicates the actual installed memory does not match the memory specified in the Setup/Configuration program.

Corrective action:

- Use the Setup/Configuration program to re-enter memory configuration information.
- Replace the main board.

Timer interrupt failure!

If this message appears, the interrupt control or timer logic may have failed. This message may also appear if the computer was turned off, and then on again very quickly.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again. Run the program again.
- Replace the main board.

Wild interrupt!

This message means that an unexpected error or memory failure exists in the computer.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again. Run the program again.
- Replace the main board.

Wild hardware interrupt!

This message means that an unexpected error or memory failure exists in the computer.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again. Run the program again.
- Replace the main board.

Chapter 7
Parts List

This chapter specifies the field-replaceable parts for the MinisPort Portable Computer. Refer to Figure 7-1 and Table 7-1.

Figure 7-1. ZL-1 Exploded View

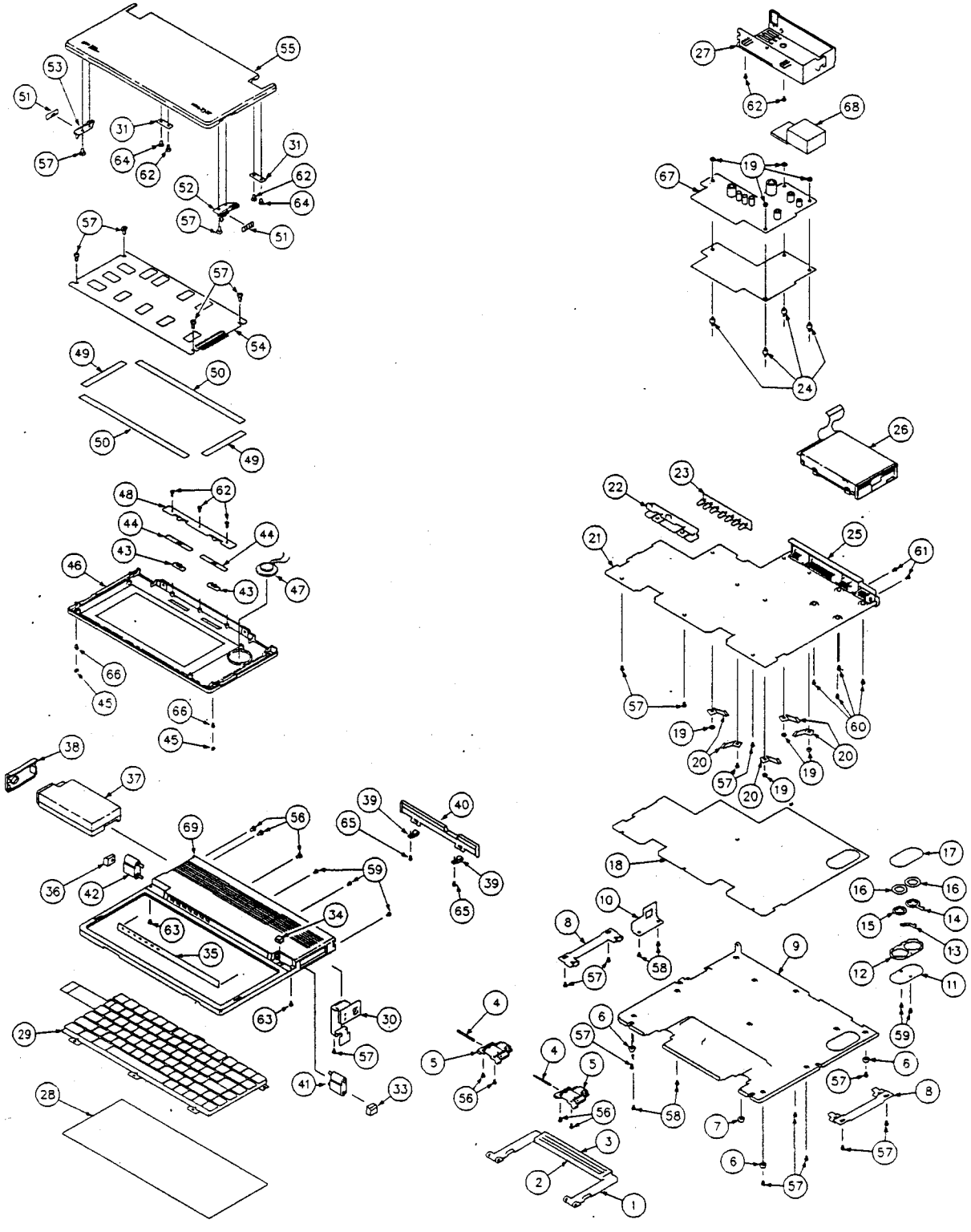


Table 7-1. ZL-1 Major Assemblies Parts List

REF. #	PART NUMBER	DESCRIPTION
1	969-1739	Handle
2	969-1740	Handle bar (A)
3	969-1741	Handle bar (B)
4	969-1742	Handle shaft
5	969-1743	Handle holder
6	969-1744	Rubber foot, screw mount
7	969-1745	Rubber foot, stick-on
8	969-1746	Main board bracket
9	969-1747	Cabinet bottom
10	969-1748	Modem cover
11	969-1749	Lithium battery cover
12	969-1750	Lithium battery case
13	969-1751	Battery contact (+)
14	969-1752	Battery contact (–)
15	969-1753	Battery contact (±)
16	969-1754	Lithium battery insulator, small
17	969-1755	Lithium battery insulator, large
18	969-1756	Mylar insulator
19	969-1757	Nut, 2.6 mm
20	969-1758	Spring sheet (grounding)
21	969-1759	Main board
22	969-1760	Modem holder
23	969-1761	LED board
24	969-1762	Power board supports
25	969-1763	Metal plate, I/O port
26	969-1764	2-inch, 1-megabyte floppy disk drive
27	969-1765	Battery pack bracket
28	969-1766	Keyboard insulator
29	969-1767	Keyboard
30	969-1768	Security module
31	969-1769	Hinge bracket
32	969-1770	Power switch knob
33	969-1771	Hinge block, right side
34	969-1772	Lid switch knob
35	969-1773	LED-nameplate
36	969-1774	Hinge block, left side
37	969-1775	Battery pack
38	969-1776	Battery door
39	969-1777	Fixture, I/O port cover
40	969-1778	I/O port cover
41	969-1779	Hinge, right side
42	969-1780	Hinge, left side
43	969-1781	Brightness/contrast knob
44	969-1782	Variable resistor slide sheet
45	969-1783	Rubber inserts, display module
46	969-1784	Display case, top
47	969-1785	Speaker
48	969-1786	20KΩ variable resistor
49	969-1787	Display tape (A)
50	969-1788	Display tape (B)

continued...

Table 7-1. ZL-1 Major Assemblies Parts List

REF. #	PART NUMBER	DESCRIPTION
51	969-1789	Opening latch knob
52	969-1790	Latch module, right side
53	969-1791	Latch module, left side
54	969-1792	LCD display
55	969-1793	Display cover, rear
56	969-1794	Screw, 2.6 x 6 mm, machine
57	969-1795	Screw, 2.6 x 5 mm, machine
58	969-1796	Screw, 2.6 x 4 mm, machine
59	969-1797	Screw, 2.0 x 4 mm, machine
60	969-1798	Screw, 2.0 x 6 mm, machine
61	969-1799	Screw, 2.6 x 4 mm, machine
62	969-1800	Screw, 2.6 x 7 mm, self-tapping
63	969-1801	Screw, 2.6 x 8 mm, self-tapping
64	969-1802	Screw, 2.6 x 6 mm, machine
65	969-1803	Screw, 2.0 x 3 mm, machine
66	969-1804	Screw, 2.0 x 8 mm, self-tapping
67	969-1805	DC power board
68	969-1806	Power transformer shield
69	969-1740	Cabinet top